TRANSITIVITY REPRESENTATIONS OF MATHEMATICS TEXTS IN *BILINGUAL MATHEMATICAL TEXTBOOK 7B OF JUNIOR HIGH SCHOOL* PUBLISHED BY ERLANGGA

A THESIS

Submitted as Partial Fulfillment of the Requirements for the Attainment of a *Sarjana Pendidikan* degree in English Language Education

By:
Ina
NIM 06202244186

DEPARTMENT OF ENGLISH LANGUAGE EDUCATION
FACULTY OF LANGUAGES AND ARTS
STATE UNIVERSITY OF YOGYAKARTA
2011

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APPROVAL SHEET

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TRANSITIVITY REPRESENTATIONS OF MATHEMATICS TEXTS IN *BILINGUAL MATHEMATICAL TEXTBOOK 7B OF JUNIOR HIGH SCHOOL* PUBLISHED BY ERLANGGA

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Accepted by the Board of the Examiners of FBS, State of Yogyakarta University on June 7, 2011 and declared to have fulfilled the attainment of a *Sarjana Pendidikan* degree in English Language Education

Board of Examiners

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Yogyakarta, June 7, 2011
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PERNYATAAN

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Judul Skripsi	: **Transitivity Representations of Mathematics Texts in *Bilingual Mathematical Textbook 7B of Junior High School* Published by Erlangga**

menyatakan bahwa karya ilmiah ini adalah hasil pekerjaan saya sendiri. Sepanjang pengetahuan saya, karya ilmiah ini tidak memuat materi yang ditulis orang lain kecuali bagian-bagian tertentu yang saya ambil sebagai acuan dengan mengikuti tata cara dan etika penulisan yang lazim.

Apabila terbukti bahwa pernyataan ini tidak benar, sepenuhnya menjadi tanggung jawab saya.

Yogyakarta, 7 Juni 2011
Penulis

Ina

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MOTTO

When life gives you a thousand reasons to cry,

show that you have a million reasons to smile.

DEDICATIONS

This thesis is lovingly dedicated to:

- My beloved mother: the soul of my life, the air of my breath. The greatest thing of my life is being the luckiest daughter to have her as my mom. She is the best mother in the world.
  I love her.

- My father: although he cannot see me – how I grow up, how I live and how I survive – I believe that he always prays for me.

- My brother and my sister – *A'* Dadan and Nur – I love them all.

- My soulmate – *A'* Deni – I really appreciate his existence. It is a great moment to be with him and to have him as my soulmate. May Allah SWT create him as my *Imam* here and hereafter, amen.

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Firstly, I would like to express my gratitude to Allah SWT, that under His blessing and great guidance, I am able to complete this thesis as one of the requirements for achieving the degree of *Sarjana Pendidikan* in English Language Education.

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Finally, I realize that this thesis is far from being perfect. However, I hope that it will give some contribution to the development of the English teaching and learning process.

Yogyakarta, June 7, 2011

Ina

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LIST OF ABBREVIATIONS

1. **Process Types:**

Mat	: Material
Men	: Mental
RAI	: Relational Attributive Intensive
RII	: Relational Identifying Intensive
RAC	: Relational Attributive Circumstantial
RIC	: Relational Identifying Circumstantial
RAP	: Relational Attributive Possessive
RIP	: Relational Identifying Possessive
Ver	: Verbal
Bh	: Behavioural
Ext	: Existential

2. **Participant Functions:**

Act	: Actor
Gl	: Goal
Rec	: Recipient
Cl	: Client
Rg	: Range
Agn	: Agent
Sns	: Senser
Phe	: Phenomenon
Car	: Carrier
Att	: Attribute
Id	: Identified
Ir	: Identifier
Sy	: Sayer
Rcv	: Reveicer
Vb	: Verbiage

Tg : Target

Bhv : Behaver

Bho : Behaviour

Ex : Existent

3. Participant Types:

H : Human

NH : Non-Human

4. Circumstantial Elements:

Du : Duration

Di : Distance

Ti : Time

Pl : Place

Mns : Means

Qu : Quality

Co : Comparison

Rsn : Reason

Pr : Purpose

Bhf : Behalf

Cmt : Comitation

Add : Addition

Mtr : Matter

Rl : Role

TRANSITIVITY REPRESENTATIONS OF MATHEMATICS TEXTS IN *BILINGUAL MATHEMATICAL TEXTBOOK 7B OF JUNIOR HIGH SCHOOL* PUBLISHED BY ERLANGGA

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ABSTRACT

This study is intended to analyze the experiential meaning of mathematics texts in *Bilingual Mathematical Textbook 7B of Junior High School* published by Erlangga. This aspect of meaning can be investigated grammatically through the concept of transitivity. This study is aimed to identify and to describe the process types, the inherent participant functions and types, and the circumstantial elements characterizing mathematics texts in *Bilingual Mathematical Textbook 7B of Junior High School* published by Erlangga.

The research employed a descriptive-qualitative method. The unit of analysis are the clauses in mathematics texts in *Bilingual Mathematical Textbook 7B of Junior High School* published by Erlangga. The main instrument in this study was the researcher herself who recorded the data into the data sheet, classified and analyzed them in terms of transitivity representations. The trustworthiness of the data analysis was achieved by applying credibility and dependability. The deep and detail observation on the data analysis were carried out in order to achieve the credibility of the data analysis. Furthermore, the triangulation techniques was used in order to get the dependability of the data analysis.

The findings show that the Relational process type typically characterizes mathematics texts in *Bilingual Mathematical Textbook 7B of Junior High School* published by Erlangga with the highest frequency of occurrences (48.34%). In accordance with the inherent participant functions, Identified and Identifier that are the participant functions of Relational process are the most two prominent participant functions (37.38%). In accordance with the inherent participant types, non-human participants are dominant in occurrences (98.86%). In regard to the circumstantial elements, the circumstance of Location of Place dominates the circumstantial elements (40.82%). In conclusion, it can be said that mathematics texts in *Bilingual Mathematical Textbook 7B of Junior High School* published by Erlangga are suffused with describing concepts. They are presented in the format of definitions, theorems, and proofs. Mathematical language mostly consists of non-human participants. Mathematics exists in non-human forms such as the numbers, the points, the lines and planes, the symbols, and the geometric figures. Furthermore, mathematical problem solving is suffused with showing on where the students do the instruction stated in the exercises.

CHAPTER I
INTRODUCTION

A. Background of the Study

English has become a lingua franca. A lingua franca can be defined as a language widely adopted for communication between two speakers whose native languages are different from each other's (Harmer, 2001: 1). People all over the world use it for communication, so that it becomes a global or an international language.

As an international language, English is considered as a very important language to be learned in Indonesia. The ultimate goal of teaching it is to set high school graduates to be ready to communicate both in oral and written English. Then, the capability would be potentially beneficial for participating in the international-level of communication.

Many schools have used English as the language instruction in the teaching and learning process. Moreover, the government through the Ministry of National Education forms RSBI (*Rintisan Sekolah Berstandar International*) or Piloting International Standardized School and SBI (*Sekolah Berstandar International*) or International Standardized School. The purpose of this project is increasing human resources of Indonesia through the education which is handled professionally, so that it is expected to be able to produce human resources which are ready to compete in a global area. According to *Undang-Undang Sistem Pendidikan Nasional* number 20 year 2003 in section 50 verse

3; it should be found minimally one International Standardized School starting from elementary school to senior high school or vocational school in a regency.

In Piloting International Standardized School/International Standardized School, English is used as the language instruction in the teaching and learning process of mathematics and science (Physics, Biology, and Chemistry). The Ministry of National Education starts implementing bilingual program in which mathematics and science are taught in English since academic year of 2004/2005.

The concept of teaching mathematics and science through English is a breakthrough to support mathematics and science development as well as English education achievement. It is based on the consideration that mathematics, science, and English are quite significant in the globalization era. They are the substances which are needed to develop technology and English is an international language which is needed as the medium of communication.

One of the schools which has become International Standardized School in DIY is SMPN 1 Bantul. The choice of this school is based on the preliminary observation that this school has good achievements. First, it has become RSBI since 2007. Second, this school is lead by a headmaster who has good leadership and much experience in education and organization. Third, this school does not only improve students' intellectual but also their life skills. Because of these good achievements, it is expected that SMPN 1 Bantul equips the students with good personality and good achievements both in academic and non-academic fields, so that they are ready to compete in a global era.

Unfortunately, during the observation the researcher found many students of class VII still faced difficulties in the teaching and learning process especially when they join mathematics class. Many students struggle with worded mathematics texts, even students who were considered by their teachers as being 'highly skilled' in mathematics. In class, they encounter problems of understanding mathematics texts. One of the problems that causes it is mathematics texts are quite complex. It can be seen when they read *Bilingual Mathematical Textbook 7B of Junior High School* published by Erlangga. They faced difficulties with vocabularies and the complex structures of the sentences.

There have been some research showing that there are various underlying language and structural patterns hindering students' interpretation of a range of mathematical discourses. Worded math texts that contain lexical ambiguities or are lexically dense, such as words that possess multiple meanings (including those with same spellings or related meanings), the use of symbols and less familiar lexical terms and the complex semantic structures that involve operation cues, are often misinterpreted by students (Zevenbergen, 2001; Monroe and Panchyshyn, 2005 in Abel and Exley, 2007). Exley (2007) adds that the grammatical density of the sentences, such as those containing more content words and fewer grammatical words, and complex and lengthy noun and verbal groups present linguistic challenges that serve to confound young students.

After observing the condition on students' difficulties, it attracts the researcher to examine the characteristics of mathematics texts. Therefore, it can be found the features and the grammatical complexity of the textbook.

B. Identification of the Problem

The observation on the students' difficulties in learning worded mathematics texts is caused by many problems. These problems might be related one another. It can be caused by students' factors, teachers' factors, teachers' teaching methods, and materials.

Firstly, the problem can be caused by students' factors. Students' motivation in learning mathematics is quite low. It happens because of two aspects: (i) they have negative perception about mathematics, for them learning mathematics is difficult, and (ii) mathematics is taught in English. Besides they should master mathematics with its concept which is complex, they also should master English which becomes the language instruction in the classroom. This condition can cause a worry for them because they learn mathematics and English at the same time. Besides, based on the observation, English is one of the difficulties that are faced by the students. As a result, students have more responsibility in following the teaching and learning process.

Secondly, the problem can be caused by teachers' factors. The demand of mastering the curriculum for International Standardized School teachers is higher than non International Standardized School teachers

because they should use English as the language instruction in the classroom. Mathematics teachers have to be language teachers at the same time. Unfortunately, teachers who teach mathematics do not have a high level of competence in English. If they cannot speak English or do not master it, the information will not be completely understood by the students.

Thirdly, the problem can be caused by teachers' teaching methods. The teachers' teaching methods applied in International Standardized School should be expanded variously in order to be able to actualize students' intellectual and emotional potency. Unfortunately, the teachers' teaching methods are not varied and still conventional – teachers have a role as people who "transfer" the knowledge, and students have a role as "the receiver" of that knowledge.

Finally, the problem can be caused by materials. Most people associate the term 'language-teaching materials' with anything that is taught to the students. The material has become a problem during the teaching-learning process because it is taught in English.

There is a general assumption that the majority of students encounter difficulties to learn mathematics using their mother tongue. Not all students can master it well. Moreover, in International Standardized School, mathematics is taught in English. This condition makes them worried. Students who are not fluent in English tend to encounter difficulties in understanding subject materials. Furthermore, often misunderstanding occurs during the lesson.

Mathematics and English have become difficult subject matters faced by the students. The materials that are presented in English have become a problem for them because in practice they do not have an adequate proficiency of English. As a result, they encounter difficulties to understand mathematics texts.

C. Delimitation of the Problem

Based on the background and identification of the problem, this study focuses on materials. Here, the researcher wants to describe the characteristics of mathematics texts in the level of lexicogrammatical aspect in order to see the grammatical complexity of them by using Halliday's functional grammar approach; that is transitivity. Transitivity is defined as the structural configuration of a clause which has a functional element such as the process, the participant involved in the process and the attendant circumstances. Therefore, transitivity catches the characteristics of texts from clause structures.

Mathematics texts that are being analyzed are taken from *Bilingual Mathematical Textbook 7B of Junior High School* published by Erlangga. Class VII is chosen because they seem to have a mature personality. Therefore, they should be ready in learning bilingual mathematics.

D. Formulation of the Problem

In accordance with the delimitation of the problem, the problems are formulated as follows: What are the transitivity process types, the inherent participant functions and types, and the circumstantial elements that characterize mathematics texts in *Bilingual Mathematical Textbook 7B of Junior High School* published by Erlangga?

E. Objectives of the Study

In accordance with the formulation of the problem, the objectives of the study are to identify and to describe the transitivity process types, the inherent participant functions and types, and the circumstantial elements that characterize mathematics texts in *Bilingual Mathematical Textbook 7B of Junior High School* published by Erlangga.

F. Significance of the Study

The results of the study are expected to give contribution both theoretically and practically.

1. Theoretically, the result of this research can be used to enrich the students on analyzing texts using transitivity.
2. Practically, the result of this research will be beneficial for the following parties. They are:

a. Students of English Department

They can use the result of the research as the sample of the grammatical complexity analysis of the texts and as their supplies to determine kinds of texts which are appropriate for the students based on their level competency.

b. Other researchers

They can use the result of the research as an input to conduct research using the same data from another point of view, for example analyzing texts in order to describe the characteristics of them seen from logical meaning, etc.

CHAPTER II
LITERATURE REVIEW, CONCEPTUAL FRAMEWORK, AND ANALYTICAL CONSTRUCT

A. Literature Review

1. On Language

Language is one of the important properties of communication. All kinds of communication activities, both spoken and written, are realized through language. With this property, people worldwide interact with one another in giving and demanding goods and services as well as information. This means that language may bring different aim and purpose, depends on the intention of the language users.

There are many definitions about language. First, according to Aitchison (2003), language is patterned system of arbitrary sound signals, characterized by structure dependence, creativity, displacement, duality, and cultural transmission. Then, Els in Siahaan (2008: 23) states that language functions as a medium of human system of communication. Meanwhile, Halliday (2003: 95) defines that language is a multiple coding system, in which meanings are coded or expressed in wordings.

Therefore, language can be briefly defined as patterned system in which human use it to communicate each other. Since language has a pattern, it can be analyzed and studied by using certain theories of language.

2. Theories of Language

According to Halliday (1994), there are two basic oppositions in describing the linguistics of a language. The more fundamental opposition is between the one that the formal linguistics is primarily syntagmatic in orientation, with its roots in logical philosophy and the other one is the functional ones, which is primarily paradigmatic, with its roots in rhetoric and ethnography.

a. Formal Linguistics

According to Hall in Kaplan (2002: 87), a formal linguistics is an explicit description of a speaker's knowledge of his or her language (s); this means that all the properties are specified fully and precisely as a system of operations on linguistic categories. The grammar will achieve explanatory adequacy if linguistic expressions can be derived from the grammar *and* if the theory accounts for how the grammar might have arisen in the mind of the speaker (Van Vallin and La Polla, 1997: 8). Formal linguistics, then, seeks the answer to two main questions: "What does it mean to say we 'know' a language?" and "How does that knowledge arise in the mind of the speaker; that is, how is it acquired?" (Kaplan, 2002: 87)

b. Functional Linguistics

Functional linguistics considers language as an essentially social phenomenon, designed for communication. The concerns of functional

linguistics are closer to the reality of language as people experience it, and it is therefore often seen as more likely than formal linguistics to be applicable to the problems of everyday life (Widdowson, 1996: 72).

There are two main views of language behind the functional linguistics. They are Tagmemic and Systemic Functional Linguistics.

1) Tagmemic Grammar

The tagmemic theory is concerned primarily with grammatical analysis. It is developed from a more comprehensive theory of language within human behaviour put out by Kenneth L. Pike.

According to Robins (1998: 279-280), there are three basic concepts under the tagmemic theory, namely:

a) Language is seen as a part of human behaviour, including verbal and non-verbal behaviour. For this reason, language cannot be separated from contexts.

b) The construct analytical and descriptive concept is the tagmem function or slot with a class of mutually substitutable items occupying that place. Tagmemes unit traditional concept such as Subject, Predicator, Object, Complement, etc. Infact, there are different sizes of units and tagmemes referred to as levels, hence there are sentence level tagmemes, clause level tagmemes, phrase level tagmemes, and word level tagmemes.

c) Tagmemic syntac involves tagmemes occupying sequential and equipollent place in structures.

2) Systemic Functional Linguistics

The name “systemic” is not the same thing as “systematic” (Halliday, 2003: 180). It is derived from the term “system”. A system is a set of options with an entry condition: that is to say, a set of things of which one must be chosen, together with a statement of the conditions under which the choice is available (Halliday, 2003: 180).

Systemic Functional Linguistics (often abbreviated to SFL) is increasingly recognized as a very useful descriptive and interpretive framework for viewing language as a strategic, making-meaning resource (Eggins, 2004: 1-2).

According to Halliday (1994), Systemic Functional Linguistics (SFL) is a theory of language centered on the notion of language function. This theory views language as a social semiotic, a resource people use to accomplish their purposes by expressing meanings in context. Language as a systemic resource for expressing meaning in context and linguistics, according to Halliday, is the study of how people exchange meanings using language (Happele, 1998: 511).

The Systemic Functional Linguistics (SFL) considers language as a resource used for communication and not as a set of rules. The general conception of language assumed in this theory contrasts linguistic forms with substances (phonic and graphic representation) one side and with situations (in relation to which the linguistic form has meaning) on the other. Central in linguistic forms are grammar and lexis. They are related to their phonic

representation through phonology and to their graphic representation through orthography.

In addition, Halliday (2003: 193) states that what distinguishes systemic theory is that its basic form of synoptic representation is not syntagmatic but paradigmatic; the organizing concept is not structure, but system. Since language is a semiotic potential, the description of a language is a description of choice. The various levels, or strata, of the semiotic 'code' are interrelated networks of options. The constituent structure is the realization of these options, and hence plays a derivative role in the overall interpretation.

3. Special Features of Systemic Functional Linguistics

There are five special features of SFL. First, SFL is oriented to the description of language as a resource for making meaning rather than a system of rules (Halliday and Martin, 1993: 22-23). Thus, semantic, grammatical and phonological systems are systems of potential, a range of alternatives. Then, the lexicogrammatical system or what the speaker can say is the realization of the semantic system of what the speaker can mean.

Second, SFL is concerned with texts rather than sentences as the basic unit through which meaning is negotiated (Halliday and Martin, 1993: 22). Because of that, the relation between the semantics and the grammar is one of realizations – the wording 'realizes' the meaning.

Third, SFL focuses on relations between texts and contexts rather than on texts as decontextualized structural entities in their own right (Halliday and Martin, 1993: 22). In other words, language here is seen as an inter organism perspective, that is, language as what goes on between people or language as interaction.

Fourth, SFL is concerned with language as a system for construing meaning rather as a conduit through which thoughts and feeling are poured. In other words, it views language as a meaning-making system rather than a meaning expressing one (Halliday and Martin, 1993: 23).

Finally, SFL is oriented to extravagance rather than parsimony. It is oriented, in other words, to develop an elaborate model in which language, life, the universe and everything can be viewed in communicative or semiotic terms (Halliday and Martin, 1993: 23).

a. Rank

Rank refers to the different ‘sizes’ of the grammatical units or layers of constituency (Halliday and Matthiessen, 1997/iii: 13). Rank orders unit into a hierarchy according to their constituency’s relation: the highest-ranking units consist of units of the rank immediately below; these units consist of units at the next rank below, and so on, until we arrive at the units of the lowest rank, which have no internal constituent structure. Rank is thus a theory of the global distribution of the units of the grammar (Halliday and Matthiessen, III/1997: 30).

According to Halliday (2004: 28), rank orders in a language consist of four elements: clause, group or phrase, word and morpheme. These rank orders can be explained as follows:

1) Clause

Clause or sentence is a group of words, usually containing a verb, which expresses a thought in the form of a statement, question, instruction or exclamation. In other words, a sentence is capable standing alone. Butt (2000: 30) says that a sentence is a piece of written language that in English conventionally begins with a capital letter and ends at the next following full stops. Halliday (2004) refers to a clause and a sentence as the same units. He builds up an understanding that says a clause is also a sentence. Clause and sentence are categorized in the same rank because both of them are equally the embodiments of group/phrase string which contains a single idea or more.

2) Group/Phrase

A group/phrase is a group of words in a sentence that functions as a single part of speech. It is a group of related words without a subject or a predicate that has a meaning and be able to act as a single part of speech. For example: *blue jacket* consists of two words, *blue* and *jacket* which form the group.

3) Word

The word is the basic unit of syntax. It is the smallest unit of language that people can understand if it is said or written on its own. For example: *book*, *car*, etc.

4) Morpheme

Morpheme is a component word that has linguistic unit and semantic meaning. According to Morley (2000: 35), morpheme is the smallest unit of grammatical form and meaning. There are two kinds of morpheme, they are: free morpheme; morpheme that can stand alone as a word, e.g. *book*, *car*, etc, and bound morpheme; morpheme that cannot stand alone as a word, e.g. *-s, -less*, *-ness*, etc.

b. Metafunctions

According to Halliday (2004), a text is built by three kinds of meanings. They are textual, interpersonal, and ideational meaning. Those aspects of meaning are commonly called metafunctions.

1) Textual Meaning

Textual meaning is relevance to the context, both the preceding text and context of situation. The textual function is described by Halliday as the one whereby language serves as a means to create texts as opposed to merely isolated and disconnected sentences. It is the function which organizes the language in a textual corpus in such a way as to give it narrative coherence (in which the ideas are presented in an acceptably logical sequence) and message cohesion (in which the wording of a sentence in a discourse takes account of and is linked to that of previous sentences), to arrange it as units of information, and to avoid unwanted redundancy. It can be said to be concerned with shaping the nature of a text in its spoken or written mode, in

other words with fashioning the texture of a passage. The scope of the textual function thus extends beyond individual sentence boundaries.

2) Interpersonal Meaning

Interpersonal meaning is meaning as a form of action. It is a kind of exchange where the speaker or writer demands something from the audience. In interpersonal meaning, the clause enacts a proposition that is explicitly addressed to a particular person (Halliday, 2004: 169). It allows us to encode meanings of attitudes, interactions, and relationship which realize tenor of discourse.

3) Ideational Meaning

Ideational meaning is the meaning as the representation of experience. It is divided into logical and experiential meaning. Logical meaning refers to relationship between one process and another or one participant and another that share the same position in the text. Experiential meaning refers to the processes, the participant in these processes, and the circumstances associated with them. It is realized through the transitivity patterns of the grammar.

c. Transitivity: Experiential at Clause Rank

As mentioned earlier, the ideational meaning is divided into two functions, that is, the logical function and the experiential function. In this section, the researcher wants to explain about the experiential function.

The most powerful impression of people's experience is that it consists of a flow of events, or 'goings-on'. This flow of events is chunked

into quanta of change by the grammar of the clause: each quantum of change is modeled as a **figure** – a figure of happening, doing, sensing, saying, being or having. All figures consist of a process unfolding through time and of participants being directly involved in this process in some way; and in addition there may be circumstances of time, space, cause, manner or one of a few other types. These circumstances are not directly involved in the process; rather they are attendant on it. All such figures are sorted out in the grammar of the clause. Thus as well as being a mode of action, of giving and demanding goods-&-services and information, the clause is also a mode of reflection, of imposing order on the endless variation and flow of events. The grammatical system by which this is achieved is that of TRANSITIVITY (Halliday, 2004: 178).

According to Eggins (2004: 206), experiential meaning is expressed through the system of transitivity or process type, with the choice of process implicating associated participant roles and configurations. Halliday (2004: 178) adds that the transitivity system construes the world of experience into a manageable set of process types. Each process type provides its own model or schema for construing a particular domain of experience as a figure of a particular kind.

A figure consists, in principle, of three components: (i) a process unfolding through time, (ii) the participants involved in the process, and (iii) circumstances associated with the process. These are organized in

configurations that provide the models or schemata for construing our experience of what goes on.

According to Halliday (2004: 181), the transitivity system is presented in Figure 1.

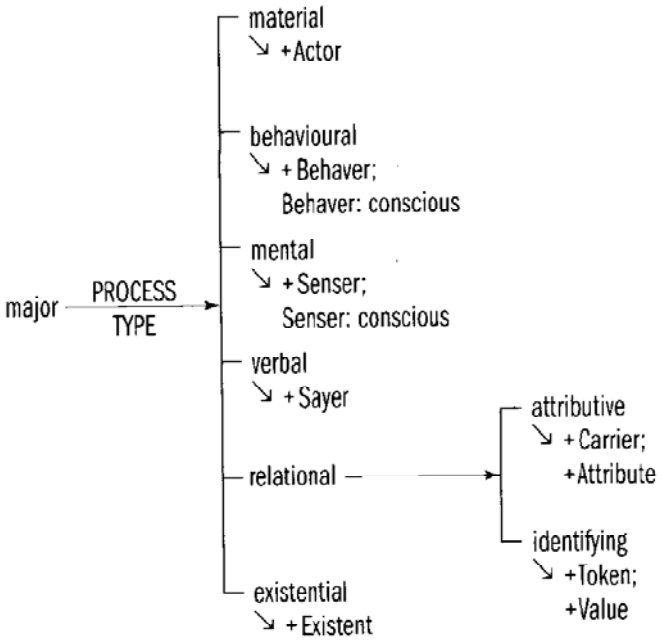

Figure 1: **Transitivity** (Halliday, 2004: 181)

1) Material Process: Doing and Happening

Material process is a process of doing-&-happening: Material process construes a quantum of change in the flow of events as taking place through some input of energy (Halliday, 2004: 187).

Material process expresses the notion that some entity ‘does’ something – which may be done ‘to’ some other entity.

One identification criterion for Material process is that it can be probed by asking: *What did x do?*

What did they do? *They built a house*

On the other hand, the process is not one of doing but one of 'happening'; Material process can also be probed by asking: *What happened to x?*

What happened to the plates? *They washed the plates*

Thus, Material process is a process about actions. Actions involve actors, or participants. Participants are realized by nominal groups.

The participants in material process are **Actor** and **Goal**. Actor is the constituent of the clause who does the deed or performs the action. When the clause only has one participant and is active, the participant will be Actor.

The lion	*sprang.*
Actor	Process: Material

Figure 2: **The Example of Actor** (Halliday, 2004: 188)

Goal is that participant at whom the process is directed, to whom the action is extended. It is the participant treated in traditional grammar as the Direct Object.

The lion	*caught*	*the tourist.*
Actor	Process: Material	Goal

Figure 3: **The Example of Goal** (Halliday, 2004: 188)

a) Other Participants in Material Process: Range

Halliday (2004) makes an important distinction between Goal and a related participant called **Range** or Scope. He suggests that Range specifies one of two things:

- either it is a restatement or continuation of the process itself or
- it expresses the extent or 'range' of the process.

The example of Range which expresses the process itself include:

They	*ran*	*the trace.*
Actor	Process: Material	Range

Figure 4: **The Example of Range** (Halliday, 2004: 202)

where *trace* is really a restatement of the process *run*.

Other examples of Range are what are called in traditional grammar cognate objects: for example, *do a dance*, *sing a song*.

The second type of Range is not cognate, but expresses the domain or extent of the process. For example:

They	*were playing*	*bridge/tennis/a game.*
Actor	Process: Material	Range

Figure 5: **The Example of Range** (Halliday, 2004: 201)

Halliday argues that constituents like *bridge* or *tennis* or *a game* are not fully autonomous participants since these games do not exist without the playing. They are just continuations of the process, expressing its range or domain. In this case it is fairly easy to see that they are not Goals because they do not exist except through the process.

Eggins (2004: 220) gives other examples to emphasize the distinctions between Range and Goal.

RANGE	**GOAL**
shoot a gun	shoot a kangaroo
kick a goal	kick the dog
serve dinner	serve the ball
give a smile	give a present
make a mistake	make a cake
take a bath	take a biscuit

b) Beneficiary

One further participant which may occur in Material process clause is Beneficiary.

But in Switzerland they give you a cognac.

They gave blood to my daughter.

These clauses involve three participants, and each case there is one participant who in some way could be said to benefit from the process: *you*, *my daughter*. Participants which benefit from the process are called Beneficiary.

There are two kinds of Beneficiary: **Recipient** and **Client**. Recipient is one that goods are given to; Client is one that services are done for (Halliday, 2004: 199). Both Clients and Recipients may occur with or without prepositions, depending on their position in the clause.

Recipient: the one goods are given to

I	*gave*	*my love*	*a ring that has no end.*
Actor	Process: Material	Beneficiary: Recipient	Goal

Figure 6: **The Example of Beneficiary; Recipient** (Halliday, 2004: 199)

Client: the one the service is done for

He	*painted*	*John*	*a picture.*
Actor	Process: Material	Beneficiary: Client	Goal

Figure 7: **The Example of Beneficiary; Client** (Halliday, 2004: 199)

c) Agent

In the description presented so far, it can be seen that the role of Actor is that of the doer, the one who does or undertakes the action. It is also useful to identify a clausal participant of Agent. Agent is the one who initiates the action, the one who makes something happen.

Typically the two roles of Agent and Actor are mapped onto the same constituent, since Actor is the one who makes the action happen, and is therefore also Agent. Agent is the external agency: in Material process it is Actor.

girlfriend = doer (Actor) + initiator (Agent)

His girlfriend	*carried*	*the bomb*	*onto the plane.*
Actor	Process: Material	Goal	

(Halliday in Eggins, 2004: 224)

2) Mental Process: Sensing

While Material process is concerned with people's experience of the material world, Mental process is concerned with people's experience of the world of their own consciousness.

Mental process is a process of sensing: Mental process construes a quantum of change in the flow of events taking place in people's own consciousness (Halliday, 2004: 205).

Mental process is expressed by the verb to do with feelings and thinking (Finch, 2000: 95). Mental process consists of configuration of a process of consciousness involving a participant endowed with consciousness and typically a participant entering into or created by that consciousness (Halliday and Matthiessen, 1994: 15).

According to Halliday (2004), there are five main criteria of Mental process.

a) In a clause of Mental process, there is always one participant who is human; this is the one that 'senses' – feels, thinks or perceives.
b) Mental process expresses facts, as facts can be sensed – seen, felt or thought; but they cannot do anything, nor can they have anything done to them.
c) The tense is in the simple present tense.
d) Mental process is represented in the language as two-way processes.
e) Mental process is a process of feeling, thinking and seeing. It is not kind of doing, and cannot be probed or substituted by *do*.

Senser and **Phenomenon** are the two participants in Mental process. Senser is the conscious being that is feeling, thinking or seeing. Phenomenon is that which is 'sensed' – felt, thought or seen.

Within the general class of Mental process, there are four different sub-types of sensing: perceptive, cognitive, desiderative, and emotive – feeling covers both desideration and emotion (Halliday, 2004: 216). Examples of verbs serving in the different types of mental clause were given in Table 1.

Table 1: **Examples of Verb Serving as Process in Mental Process** (Halliday, 2004: 218)

perceptive	perceive, sense; see, notice, glimpse; hear, overhear; feel; taste; smell
cognitive	think, believe, suppose, expect, consider, know; understand, realize, appreciate; imagine, dream, pretend; guess, reckon, conjecture, hypothesize; wonder, doubt; remember, recall, forget; fear (think fearfully)
desiderative	want, wish, would like, desire; hope (for), long for, yearn for; intend, plan; decide, resolve, determine; agree, comply, refuse
emotive	Like, fancy, love, adore, dislike, hate, detest, despise, loathe, abhor; rejoice, exult, grieve, mourn, bemoan, bewail, regret, deplore; fear, dread; enjoy, relish, marvel

He	*saw*	*the car.*
Senser	Process: Mental; Perceptive	Phenomenon

Figure 8: **The Example of Mental Process** (Halliday, 2004: 216)

3) Relational Process: Being and Having

The category of Relational process covers many different ways in which *being* can be expressed in English clauses. As this is a rich and complex area of clause Transitivity, the discussion here can only provides an outline. The researcher will begin by clarifying the basic structural difference between Attributive and Identifying processes, exemplified initially for the *intensive* sub-type.

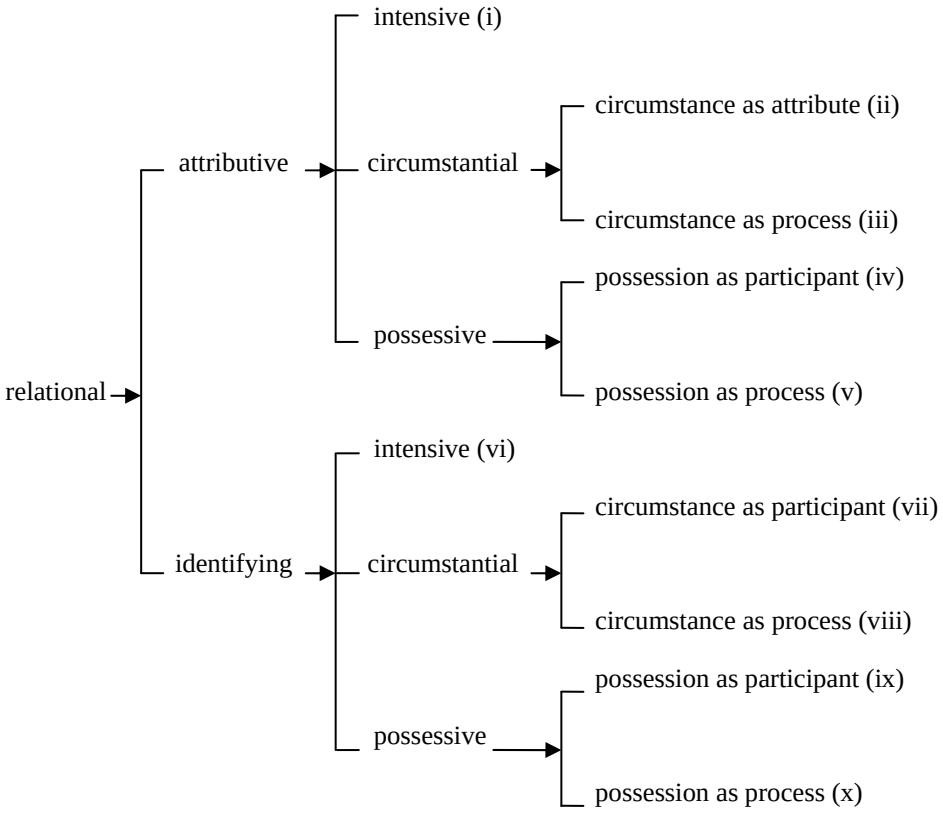

Figure 9: **Relational Process by Halliday** (in Eggins, 2004: 239)

a) Intensive Attributive Process

Intensive Relational process involves establishing a relationship between two terms, where the relationship is expressed by the verb *be* or a synonym. In Attributive sub-type, a quality, classification or descriptive epithet (**Attribute**) is assigned to a participant (**Carrier**). Carrier is always realized by a noun or nominal group.

The meaning of Attributive Intensive is that '*x is a member of the class a*'. In this classification kind of Attributive Intensive, Attribute is also a nominal group, typically an indefinite nominal (introduced by *a/an*).

She	*is*	*a leader.*
Carrier	Process: Intensive	Attribute

Figure 10: **The Example of Intensive Attributive Process**
(Halliday, 2004: 224)

In the descriptive Attributive Intensive, Attribute is a quality or epithet ascribed to Carrier, i.e. '*x carries the attribute a*'. In these Attributive Intensives, Attribute is typically an adjective:

She	*is*	*wise.*
Carrier	Process: Intensive	Attribute

Figure 11: **The Example of Intensive Attributive Process**
(Halliday, 2004: 224)

The essential characteristic of Attributive Intensive (as indeed for all Attributive Relationals) is that Attributive clause is not reversible. This means that there is no passive form of the clause: the Subject can never conflate with the role of Attribute, but will always conflate with the role of Carrier. This is

because Attributive Intensives in fact contain only one independent nominal participant, Carrier, with the Attribute functioning to encode the ascription assigned to Carrier.

b) Intensive Identifying Process

Intensive Identifying process contrasts with Attributives both semantically and grammatically. Semantically, Identifying clause is not about ascribing or classifying, but defining. The meaning of Identifying Intensive is that 'x is identified by a' or 'a serves to define the identity of x'. Structurally the *x*-element, which is to be identified, is labelled as **Identified** and the *a*-element, which serves as identity, is labelled as **Identifier**. For example, in the clause:

You	*are*	*the skinniest one here.*
Token/Identified	Process: Intensive	Value/Identifier

Figure 12: **The Example of Intensive Identifying Process**
(Halliday in Eggins, 2004: 241)

you is identified as the 'holder' or 'occupant' of the identity or label of *skinniest one*.

Grammatically, defining involves two participants: Token (that which stands for what is being defined) and Value (that which defines). Both Token and Value are realized by nominal groups. Typically the nominal groups in Identifying Intensives are definite, whereas in Attributives Attribute is an indefinite nominal group, e.g. *the skinny one* (Identifying) vs *a skinny one* (Attributive). Because Identifying clause contains two autonomous

nominal participants, all Identifying clauses are reversible, i.e. they can form passives.

The reversibility of Identifying Intensives raises the question of determining which 'side' of the clause is Token and which Value. This can be determined both semantically and grammatically.

Halliday points out that semantically Token will be a 'sign, name, form, holder and occupant' of Value, which gives the 'meaning, referent, function, status or role' of Token. Token, then, is the nominal group which contains the 'name', and Value is the nominal group which gives the classification. Often, semantic criteria will indicate immediately which part of the clause is Token or Value.

However, it is the grammatical test which determines role assignment. The test involves replacing the verb *to be* with one of the synonymous Identifying Intensive verbs listed above, and then determining whether the resulting clause is active or passive, and which constituent is functioning as Subject. The correlation is that:

- TOKEN will always be Subject in an active clause
- VALUE will always be Subject in a passive clause

c) Other Common Sub-Types of Relationals: (1) Circumstantial

Circumstantial Relational process encodes the meaning about the circumstantial dimension. In Attributive Circumstantial, Circumstance is often expressed in Attribute. While the verb remains Intensive, Attribute will be a prepositional phrase or an adverb of location, manner, cause etc.

The meeting	*is*	*on Friday.*
Carrier	Process: Intensive	Attribute/Circumstance

(Halliday, 2004: 247)

As with all Attributive process, these cannot form passives:

∗*On Friday is been by the meeting.*

Circumstantial meaning may also be encoded in the process itself, with the verb meaning '*is + circumstance*'. In this case, the process is specified as '*circumstantial*'.

The operation	*lasted*	*one hour.*
Carrier	Process: Circumstantial	Attribute

(Halliday in Eggins, 2004: 246)

When circumstantial meaning is encoded through the participants, both Token and Value will be circumstantial elements of time, place etc., while the verb remains intensive:

Yesterday	*was*	*the last time Di gave blood.*
Token/Identified/ Circumstance	Process: Intensive	Value/Identifier/ Circumstance

(Halliday in Eggins, 2004: 246)

Circumstance may also be expressed through the process, using verbs such as *take up*, *follow*, *cross*, *resemble*, *accompany etc*. In these cases, the process is labeled as 'circumstantial'.

The terrorist	*accompanied*	*the young woman.*
Token/Identified	Process: Circumstantial	Value/Identifier

(Halliday in Eggins, 2004: 246)

Being Identifying, these verbs form passives:

One hour was taken up by the operation.

The young woman was accompanied by the terrorist.

One little of liquid is held by a milk of bottle.

d) Other Relationals: (2) Possessives

Possessive process encodes the meaning of ownership and possession between casual participants. In Attributive Possessives, possession may be encoded through the participants (with Attribute Possessor, and the process remaining Intensive):

This	*is*	*yours.*
Carrier/Possessed	Process: Intensive	Attribute/Possessor

(Halliday in Eggins, 2004: 247)

Possession may also be encoded through the process, the commonest Attributive possessive verbs being *to have* and *to belong to*. Typically Carrier will be Possessor:

I	*had*	*a daughter.*
Carrier/Possessor	Process: Possession	Attribute/Possessed

(Halliday in Eggins, 2004: 247)

It is possible to have Carrier as what is possessed:

The bomb	*belonged to*	*the boyfriend.*
Carrier/Possessed	Process: Possession	Attribute/Possessor

(Halliday in Eggins, 2004: 247)

Attributive possessive process is not reversible:

∗*The boyfriend was belonged to by the bomb.*

In Identifying possessives, possession may again be expressed either through the participants, or through the process. When possession is expressed through the participants, the intensive verb *to be* is used, with Token and Value encoding Possessor and Possessed.

The bomb	*was*	*her boyfriend's.*
Token/Possessed	Process: Intensive	Value/Possessor

(Halliday in Eggins, 2004: 247)

Her boyfriend's	*was*	*the bomb.*
Value/Possessor	Process: Intensive	Token/Possessed

(Halliday in Eggins, 2004: 248)

The commonest Identifying possessive process is *to own*, which can form passives, so that either Token or Value can be Subject:

The bomb	*was owned by*	*her boyfriend.*
Value/Possessed	Process: Possession	Token/Possessor

Her boyfriend	*owned*	*the bomb.*
Token/Possessor	Process: Possession	Value/Possessed

(Halliday in Eggins, 2004: 248)

4) Behavioural Process: Behaving

Halliday (2004) describes this process semantically as a 'half-way house' between Mental and Material processes. That is, the meaning it realizes is mid-way between Materials on the one hand and Mental on the other. It is in part about action, but it is action that has to be experienced by a conscious being. Behavioural process is typically process of physiological and psychological behaviour. For example: *breathe, cough, dream, frown, gawk, grimace, grin, laugh, look over, scowl, smile, sniff, snuffle, stare, think on, watch etc*.

Indicating its close relationship with Mental process, Behavioural process in fact contrasts with Mental process synonyms, e.g. *look at* is Behavioural but *see* is Mental, *listen to* is Behavioural but *hear* is Mental.

The majority of Behavioural process has only one participant. Behavioural process thus expresses a form of doing that does not usually extend to another participant. This one obligatory participant is called **Behaver**, and is typically a conscious being (like Senser in Mental process):

She	*sighed*	*with despair.*
Behaver	Process: Behavioural	

He	*coughed*	*loudly.*
Senser	Process: Behavioural	

Figure 13: **Examples of Behavioural Process**
(Halliday in Eggins, 2004: 234)

Behavioural process can contain a second participant that is like Range: a restatement of the process. This participant is called **Behaviour**:

He	*smiled*	*a broad smile.*
Behaver	Process: Behavioural	Behaviour

(Halliday in Eggins, 2004: 234)

If there is another participant which is not a restatement of the process, it is called Phenomenon:

George	*sniffed*	*the soup.*
Behaver	Process: Behavioural	Phenomenon

(Halliday in Eggins, 2004: 234)

While Behavioural process displays many features of Mental process, the process functions more like one of 'doing' than one of 'thinking/feeling' etc. The evidence for this is that the unmarked present tense for Behavioural process is the present continuous, as it is for Materials.

present continuous tense (unmarked) *I am watching the operation.*

They're all listening to Di's story.

present tense (marked) *I watch the operation.*

They listen to Simon's story.

Also like Materials, Behavioural process cannot project, i.e. it cannot quote or report:

∗*They're all listening [that] Simon's story...*

Thus, Behavioural process, involving the role of a conscious being but being unable to project and taking present continuous tense, is half-way mixes both semantically and grammatically between Mental and Material processes.

5) Verbal Process: Saying

This is a large category, which includes verbs such as say, report, claim, question, and explain (Finch, 2000: 96). According to Halliday (2004), there are four criteria of Verbal process.

a) Verbal process does not require a conscious participant. **Sayer** can be anything that puts out a signal, like *the guidebook* in *the guidebook tells you where everything is*. It can just readily be *it* as *he* or *she*. For this reason Verbal process might more appropriately be called 'symbolic' process.

b) The verbalized clause may be either (a) a proposition (information), as in *(he told me) it was Tuesday*, or (b) a proposal (goods and services), as in *(she told him) to mend his ways*. The proposal may be expressed alternatively by a modulated declarative clause, e.g. *(she told him) that he should/must mend his ways*.

c) There are three further participant functions in addition to Sayer: (i) Receiver, (ii) Verbiage, and (iii) Target.

(i) **Receiver** is the one to whom the saying is directed; for example, *me, your parents, the court* in *tell me the whole truth, did you repeat that to your parents? Describe to the court the scene of the accident*. Receiver may be Subject in a clause which is 'receptive'; for example, *I* in *I wasn't told the whole truth*. Receiver is realized by a nominal group typically denoting a conscious being (a potential speaker), a collective or an institution; the nominal group either occurs on its own or is marked by a preposition – almost always *to* but something *of*. The range of realizational possibilities depends on the lexical verb of the verbal group realizing the process; for example, *tell sb, say to sb, demand of sb*.

(ii) **Verbiage** is the function that corresponds to what is said, representing it as a class of thing rather than as a report or quote; for example, *what* in *what did you say?* Verbiage is a nominalised statement of verbal process: noun expressing some kind of verbal behaviour, e.g. *statement, questions, report, answer, story etc*.

(iii) **Target** occurs only in a sub-type of 'verbal' clause; this function construes the entity that is targeted by the process of saying.

<table>
<tr><td>John</td><td>said</td><td>"I'm hungry".</td></tr>
<tr><td>Sayer</td><td>Verbal</td><td rowspan="2">Quoted</td></tr>
<tr><td colspan="2">Quoting</td></tr>
</table>

'why are you late?'	*he*	*demanded*
Quoted	Sayer	Verbal
	Quoting	

He	*promised*	*to go*	*home.*
Sayer	Verbal	Material	Range
Reporting		Reported	

I	*asked*	*them*	*to avoid*	*the scar tissue.*
Sayer	Verbal	Receiver	Material	Goal
Reporting			Reported	

He	*told*	*me*	*a pack of lies.*
Sayer	Verbal	Receiver	Verbiage
Reporting			Reported

I	*'m always praising*	*you*	*to my friends.*
Sayer	Verbal	Target	Recipient

Figure 14: **Examples of Verbal Process**
(Halliday in Eggins, 2004: 235-237)

6) Existential Process: Existing

This process represents that something exists or happens (Halliday, 2004: 264). In addition, Eggins (2004: 238) says that Existential process represents experience by positing that 'there are/is something'.

Existential process is easy to identify as the structure involves the use of the word *there*. *There* acts as a grammatical subject, for example, *there was a cat*.

There, when used in Existential process, has no representational meaning: it does not refer to a location. It is present in the clause merely because all English clauses require a Subject. It is important to distinguish between *there* used as an Existential Subject, and *there* as a Circumstance of location. While structural *there* is usually unstressed, circumstantial *there* is usually stressed and often carries an intonation contour:

structural there: *There is a book on the table, and a bag on the chair*.

circumstantial there: *There is your book – on the table*.

The structural *there* in Existential process does not receive any functional label, as it is not encoding any representational meaning. It is left unanalyzed for transitivity.

Existential process typically employs the verb *be* or synonyms such as *exist*, *arise*, *occur*. The only obligatory participant in Existential process which receives a functional label is called **Existent**. This participant, which usually follows the *there is/there are* sequence, may be a phenomenon of any kind, and is often in fact an event (nominalised action), e.g. *there was a battle*.

There	*was*	*snow*	*on the ground.*
	Existential	Existent	

There	*were*	*these two wonderful Swiss men.*
	Existential	Existent

Should	*there*	*Arise*	*any difficulties*
		Existential	Existent

Figure 15: **Examples of Existential Process**
(Halliday in Eggins, 2004: 238)

7) Circumstantial Elements

The principal types of circumstantial elements in English are as follows: Extent and Location in time and space, including abstract space; Manner (means, quality, and comparison); Cause (reason, purpose, and behalf); Accompaniment; Matter; Role.

a) Extent and Location

Table 2: **Extent and Location** (Halliday, 2004: 272)

	Spatial	Temporal
Extent	Distance	Duration/Frequency
Location	Place	Time

The interrogative forms for Extent are: *how far*, *how long*, *how many (measure units)*, *how many times*. The typical structure is a nominal group with quantifier, either definite, e.g. *five days*, or indefinite, e.g. *many miles*, *a*

long way; this occurs either with or without preposition, the most usual preposition being *for*.

The general interrogatives of Location are: *where*, *when*. Typical structure is an adverbial group or prepositional phrase; examples are: *underneath, by the door, in Canberra, long ago, before sunset, on Wednesday evening*.

b) Manner

The circumstantial element of Manner comprises three sub-categories: Means, Quality, and Comparison.

Means refers to the means whereby a process takes place; it is typically expressed by a prepositional phrase with the preposition by or with. The interrogative forms are *how* and *what with*. Quality is typically expressed by an adverbial group, with –ly adverb as Head; the interrogative is *how*. Comparison is typically expressed by a prepositional phrase with *like* or *unlike*, or an adverbial group of similarity or difference. The interrogative is *what ... like.*

c) Cause

The circumstantial element of Cause also comprises three sub-categories: Reason, Purpose, and Behalf.

A circumstantial element of Reason represents the reason for which a process takes place – what causes it. It is typically expressed by a prepositional phrase with *through* or a complex preposition such as *because of, as a result of, thanks to*. The corresponding WH-forms are *why* or *how*.

Circumstantials of Purpose represent the purpose for which an action takes place – the intention behind it. They are typically expressed by a prepositional phrase with *for* or with a complex preposition such as *in the hope of, for the purpose of*. The interrogative corresponding is *what for*.

Expressions of Behalf represent the entity, typically a person, on whose behalf or for whose sake the action is undertaken – who it is for. They are expressed by a prepositional phrase with for or with a complex preposition such as for the sake of, on behalf of. The usual interrogative is *who for*.

d) Accompaniment

This element represents the meanings ‘and’, ‘or’, ‘not’ as circumstantials; it corresponds to the interrogatives and *who/what else*, *but not who/what*. It is expressed by a prepositional phrases with prepositions such as *with, without, besides, instead of.*

Accompaniment is divided into two categories. They are commitive and additive. Commitive represents the process as a single instance of a process, although one in which two entities are involved, for example, *Fred and Tom set out together*. Additive represents the process as two instances; here both entities clearly share the same participant function, but one of them is presented circumstantially for purposes of contrast, for example, *Fred and Tom both came, Fred came as well as Tom, etc* (Halliday, 2004).

e) Matter

This element corresponds to the interrogative *what about* and is expressed by prepositional phrases with prepositions such as *about, concerning, with reference to* and sometimes simply *of*. For example: *I worry about her health* (Halliday, 2004).

f) Role

This element corresponds to the interrogative *what as* and represents the meaning of 'be' (attribute or identify) in the form of a circumstance. The usual preposition is *as*; other complex prepositions with this function are *by way of, in the role/shape/guise/form of,* for example, *they leave the place untidy by way of protest* (Halliday, 2004).

4. About *Bilingual Mathematical Textbook 7B of Junior High School*

Bilingual Mathematical Textbook 7B of Junior High School is written by M. Cholik Adinawan and Sugijono and published by Erlangga in 2009. This book has been compiled in compliance with the *Standar Isi 2006* for use in *Sekolah Menengah Pertama (SMP)* and *Madrasah Tsanawiyah (MTs)*. It is written in English.

This book is intended to provide students with guides and tricks to learn mathematics in an easy, comprehensive, correct, and structured way. It is presented in a style which encourages conceptual understanding and emphasizes the following important aspects in learning mathematics.

a. Recognizing facts, understanding concepts, deriving formulas and proving theorems.
b. Applying concepts, theorems and formulas; this is exemplified in worked problems.
c. Working out structured problems, i.e., those which are given in increasing difficulty, and problems which require problem solving skill.

Each chapter provides activity in which invite students to get the experience of inventing certain mathematical concepts or properties on their own. Each chapter also provides tasks, through which students apply mathematical concepts (Contextual Teaching Learning and problem solving).

Furthermore, exercise problems are classified according to instructional objectives:

- *Lighbulb icon* tells that a problem is designed to measure students' conceptual understanding.
- *Mouse icon* tells that a problem is designed to measure students' conceptual application and communication skills.
- *Brain icon* tells that a problem is designed to measure students' problem solving skills.

5. About Mathematics Texts

The language of mathematics which refers to a mathematics text has been a concern of the mathematics education community for some time. Several substantial efforts having been made to describe its characteristics

and, in particular, the ways in which it may support or cause difficulties for learners of mathematics.

Mathematics texts differ from texts in other subjects. Research has shown that mathematics texts contain more concepts per sentence and paragraph than any other type of text. They are written in a very compact style; each sentence contains a lot of information, with little redundancy. The text can contain words as well as numeric and non-numeric symbols to decode. In addition, a page may be laid out in such a way that the eye must travel in a different pattern than the traditional left-to-right one of most reading. There may also be graphics that must be understood for the text to make sense; these may sometimes include information that is intended to add to the comprehension of a problem but instead may be distracting. Finally, many texts are written above the grade level for which they are intended (Barton and Heidema, 2002).

Adding to the confusion of this dense language of symbols is the fact that many mathematical terms have different meanings in everyday use. For example, the word *similar* means “alike” in everyday usage, whereas in mathematics it means that the ratios of the corresponding sides of two shapes are equivalent and corresponding angles are equal. Thus in everyday English, all rectangles are “similar” because they are alike, whereas in mathematics they are “similar” only if the ratio of the short sides equals the ratio of the long sides. Mathematical terms such as *prime, median, mean, mode, product,*

combine, dividend, height, difference, example, and *operation* all have different meanings in common parlance.

B. Conceptual Framework

In this study, the researcher wants to analyze mathematics texts in *Bilingual Mathematical Textbook 7B of Junior High School* published by Erlangga as the data of the research. The data are taken in the form of clauses. They are analyzed using Halliday's Functional Grammar theory (2004).

Every text has three kinds of meanings, namely the textual meaning – it organized the clause as the message that becomes the marker of a text in a language, the interpersonal meaning – the clause enacts a proposition that is explicitly addressed to a particular person, and the ideational meaning – it is the meaning as representation of experience.

The ideational meaning can be divided into two functions: the logical function and the experiential function. However, the topic investigated in this study is limited to one kind of meaning, that is, the experiential meaning. This meaning is realized through the transitivity system, which is realized through the structural configurations of clause which have functional elements, namely the process itself, the participants involved in the process, and the attendant circumstance.

There are six types of processes in the transitivity system.

1. Material Process

Material process is process of doing and happening including actions, activities, and events. It expresses the notion that some entities do something which may be done to some other entities. Participants in Material process are Actor, Goal, Range, Beneficiary; Recipient and Client, and Agent. For example, *Diana went to Geneva*.

2. Mental Process

Mental process is process of sensing. It is expressed by the verbs to do with feelings and thinking. It also consists of configuration of a process of consciousness involving a participant endowed with consciousness and typically a participant entering into or created by that consciousness. Participants in Mental process are Senser and Phenomenon. For example, *I believe you.*

3. Relational Process

Relational process is process of being and having. This is characteristically expressed by 'liking' verbs. The purpose of these verbs is to relate two participants together. The fundamental process here is one of 'being'. Moreover, the argument in Relational process focuses on problem of existence and attribution, and these are expressed through Relational process with verbs such as *represent* and *be*. Participants in Relational process are Carrier, Attribute, Identifier, and Identified. For example, *you are very skinny*.

4. Behavioural Process

Behavioural process is process of behaving. This is process of (typically human) psychological and physiological behaviour like breathing, coughing, smiling, dreaming and starting. The participants in Behavioural process are Behaver and Behaviour. For example, *he smiled a broad smile*.

5. Verbal Process

Verbal process is process of saying. It includes verbs such as say, report, claim, question, and explain. Participants in Verbal process are Sayer, Receiver, Verbiage, and Target. For example, *John said "I'm hungry"*.

6. Existential Process

Existential process is process of existing. This process represents that something exists or happens. The participant in Existential process called Existent. For example, *there is a book on the table*.

For the circumstances, there are seven circumstances.

1. Extent

Extent construes the extent of the unfolding of the process in space-time: the distance in space over which the process unfolds or the duration in time during which the process unfolds. The interrogative forms for Extent are *how far*, *how long, how many (measure units), how many times*. The typical structure is a nominal group with quantifier, either definite, e.g. *five days*, or indefinite, e.g. *many miles, a long way*; this occurs either with or without preposition, the most usual preposition being *for*.

2. Location

Location construes the location of the unfolding of the process in space-time: the place where it unfolds or the time when it unfolds. The general interrogatives of Location are *where*, *when*. Place includes not only static location in space, but also the source, path and destination of movement. Similarly, time includes not only static location in time, but also the temporal analogues of source, path and destination. For example, *outside the station, right into Pitt Street, etc*.

3. Manner

Manner comprises three sub-categories: Means, Quality, and Comparison. Means refers to the means whereby a process takes place; it is typically expressed by a prepositional phrase with the preposition by or with. The interrogative forms are *how* and *what with*. Quality is typically expressed by an adverbial group, with –ly adverb as Head; the interrogative is *how*. Comparison is typically expressed by a prepositional phrase with *like* or *unlike*, or an adverbial group of similarity or difference. The interrogative is *what ... like.*

4. Cause

Cause comprises three sub-categories: Reason, Purpose, and Behalf. Reason represents the reason for which a process takes place – what causes it. It is typically expressed by a prepositional phrase with *through* or a complex preposition such as *because of, as a result of, thanks to*. The corresponding WH-forms are *why* or *how*. Purpose represents the purpose

for which an action takes place – the intention behind it. It is typically expressed by a prepositional phrase with *for* or with a complex preposition such as *in the hope of, for the purpose of*. The interrogative corresponding is *what for*. Expressions of Behalf represent the entity, typically a person, on whose behalf or for whose sake the action is undertaken – who it is for. They are expressed by a prepositional phrase with for or with a complex preposition such as for the sake of, on behalf of. The usual interrogative is *who for*.

5. Accompaniment

This element represents the meanings 'and', 'or', 'not' as circumstantials; it corresponds to the interrogatives and *who/what else, but not who/what*. It is expressed by a prepositional phrases with prepositions such as *with, without, besides, instead of.*

Accompaniment is divided into two categories. They are commitive and additive. Commitive represents the process as a single instance of a process, although one in which two entities are involved, for example, *Fred and Tom set out together*. Additive represents the process as two instances; here both entities clearly share the same participant function, but one of them is presented circumstantially for purposes of contrast, for example, *Fred and Tom both came, Fred came as well as Tom, etc*.

6. Matter

This element corresponds to the interrogative *what about* and is expressed by prepositional phrases with prepositions such as *about, concerning, with reference to* and sometimes simply *of*. For example: *I worry about her health*.

7. Role

This element corresponds to the interrogative *what as* and represents the meaning of 'be' (attribute or identify) in the form of a circumstance. The usual preposition is *as*; other complex prepositions with this function are *by way of, in the role/shape/guise/form of,* for example, *they leave the place untidy by way of protest*.

C. Analytical Construct

The analytical construct of this study can be seen in Figure 16 overleaf:

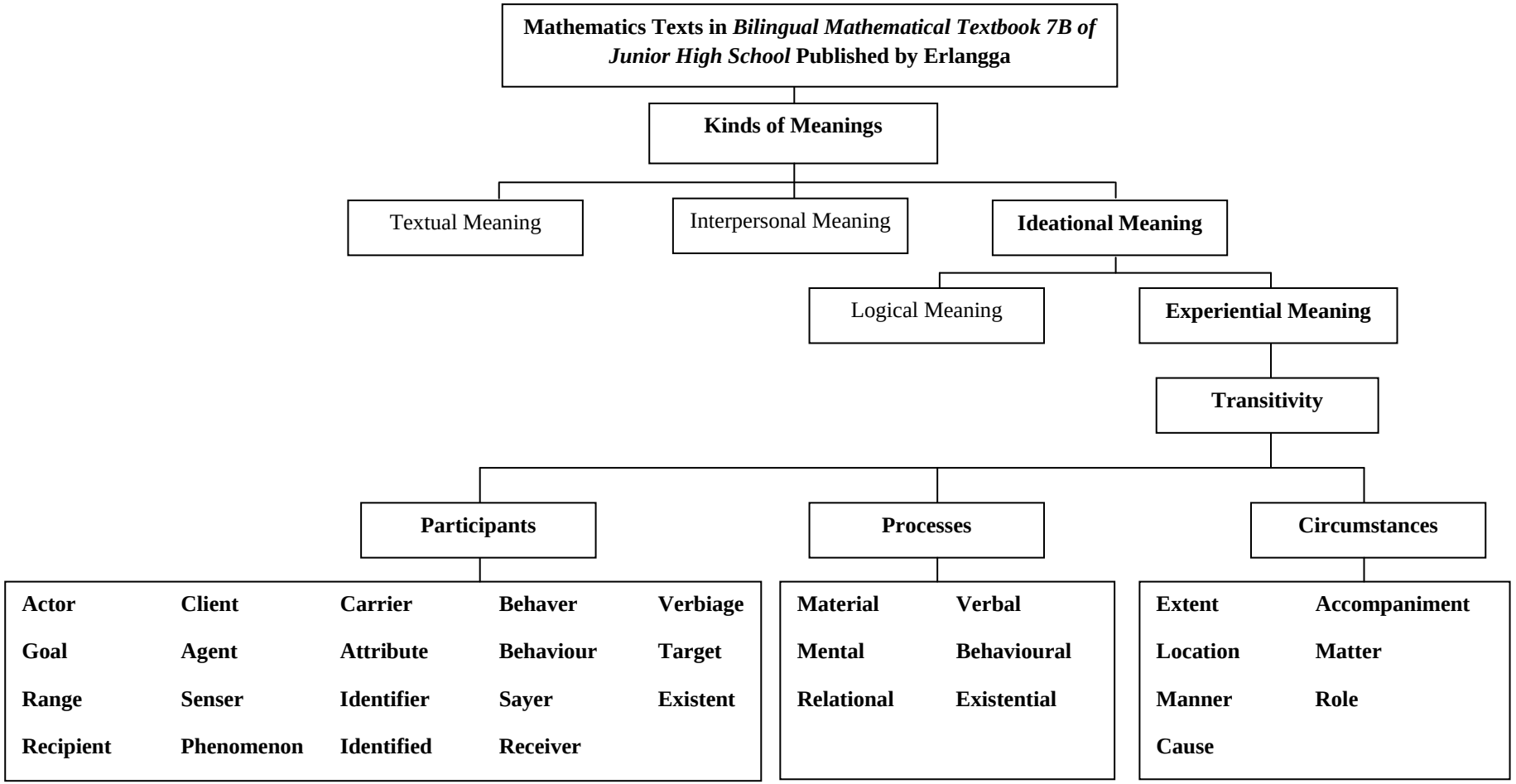

Figure 16: **The Analytical Construct of "Transitivity Representations of Mathematics Texts in *Bilingual Mathematical Textbook 7B of Junior High School* Published by Erlangga"**

CHAPTER III
RESEARCH METHOD

A. Type of the Study

This study employed a descriptive-qualitative method. A qualitative method refers to the research procedures which produce descriptive data such as people's own written or spoken words and observable behaviour (Bodgan and Taylor, 2002). According to Arikunto (1993: 208), there is no hypothesis in descriptive research as it describes a phenomenon without making any hypothesis. In this type of research, the researcher collects the data, analyzes them, and draws a conclusion without making any generalization.

Applying a descriptive-qualitative method, this research aims at describing the characteristics of mathematics texts in *Bilingual Mathematical Textbook 7B of Junior High School* published by Erlangga using Halliday's Functional Grammar theory. In analyzing the data, this research used content analysis in which the researcher related the contexts of the data with the analyzed data in order to make replicable and valid inferences from the data to their context. This research also applied a semantic content analysis, which analyzes the data in terms of meanings, yet it focuses on the lexicogrammar content analysis, which analyzes the data using transitivity system.

B. Data and Sources of the Data

According to Chapelle (1998), the unit of analysis for Systemic Functional Linguistics is the text because the functional meaning potential of language is realized in units no smaller than texts.

The data of the research were in the form of clauses, which formed mathematics texts taken from *Bilingual Mathematical Textbook 7B of Junior High School* published by Erlangga.

C. Instruments of the Research

The main instrument in this research was the researcher herself. She acted as the planner, data collector, analyst, and finally the reporter of the research findings. It is in accordance with Moleong (2007: 168) who states that in qualitative research the main instrument is the researcher.

The secondary instrument was the data sheets in which transitivity classification of the data were recorded. The classification was used as the direction to conduct the identification of the process types, the inherent participants functions and types, and circumstantial elements.

D. Procedure of the Research

In this study, the content analysis technique is used to analyze the data. The content analysis that is carried out follows the following procedures. The first procedure is data collection. The data were collected from mathematics texts in *Bilingual Mathematical Textbook 7B of Junior*

High School published by Erlangga. The second procedure is data analysis which concerns the more conventional processes of identification and representation of patterns that are significant to the results of the analysis. The data were analyzed based on Halliday's Functional Grammar theory. The last procedure is making inferences based on the results of the analysis.

1. Data Collection

The data were taken in the form of clauses of mathematics texts in *Bilingual Mathematical Textbook 7B of Junior High School* published by Erlangga. The data were collected through documentation. The data collection in this research takes the following steps below:

a. Collecting the data by gathering mathematics texts in *Bilingual Mathematical Textbook 7B of Junior High School* published by Erlangga,
b. Reading and observing each clause carefully to find the process types, inherent participant types and functions, and attendant circumstantial elements,
c. Classifying and identifying the data according to their features,
d. Transferring the data to the data sheets in the form of different codes, for example, in process types *Mat* for Material process and *Men* for Mental process, in participant functions *Act* for Actor and *Gl* for Goal, in participant types *H* for Human participants and *NH* for Non-Human participants, and in circumstantial types *Ti* for Time and *Mns* for Means. The complete code used in this study can be seen under the list of abbreviations. Below is the table of the data sheets:

Table 3: **Data Sheet of Process Types and Participant Functions**

No	Clause Expressions	Process Types											Participant Functions																		
		Mat	Men	RAI	RII	RAC	RIC	RAP	RIP	Ver	Bh	Ext	Act	Gl	Rec	Cl	Rg	Agn	Sns	Phe	Car	Att	Id	Ir	Sy	Rcv	Vb	Tg	Bhv	Bho	Ex

Table 4: **Data Sheet of Circumstantial Elements**

No	Clause Expressions	Participant Types		Circumstantial Elements													
				Extent		Location		Manner			Cause		Accompaniment				
		H	NH	Du	Di	Ti	Pl	Mns	Qu	Co	Rsn	Pr	Bhf	Cmt	Add	Mtr	Rl

2. Data Analysis

According to Moleong (2002), data analysis is a process of organizing and classifying data into certain pattern, category, and basic unit of analysis. The goals of data analysis are to summarize the data, to represent them so that they can be better comprehended, interpreted, or related to some decision the user wishes to make.

The data analysis in this research takes the following steps below:

a. Analyzing the data by counting the frequencies of occurrences of process types, participant functions, participant types, and circumstantial elements,
b. Writing down the frequency of occurrence of each type in the data sheets,
c. After all the types were identified and written down, they were used as the basis to make inferences. The types of process, participant, and circumstance that were in the highest frequency were considered as types that characterize mathematics texts in *Bilingual Mathematical Textbook 7B of Junior High School* published by Erlangga.

D. Trustworthiness of the Data Analysis

The trustworthiness of the data covers credibility, dependability, and transferability (Moleong : 2002). In this research, the trustworthiness of the data was gained by using credibility and dependability.

The deep and detail observation on the data analysis was carried out in order to achieve the credibility of the data analysis. Thus, the data analysis

can be regarded as credible. The data analysis were also read and reread carefully and comprehensively until they were certainly in accordance with the research questions.

The triangulation techniques, which utilized sources outside the data verify the data analysis or to compare them, was used in order to get the dependability of the data analysis. Consultants' judgments and sources were significantly important and practical in this study. Judgements from Mr. Suhaini M. Saleh, M.A. and Mrs. Siti Mukminatun, M.Hum. as the consultants and friends as the observers were needed to verify the research data. The data analysis were discussed and consulted with the consultants. Moreover, sources from books which were related to transitivity theory were used to match up the findings in this study.

CHAPTER IV
FINDINGS AND DISCUSSION

This chapter consists of two main sections: findings and discussion. The findings are concerned with the description of the transitivity representation including the process types, the participant functions and types, and the circumstantial elements of mathematics texts in *Bilingual Mathematical Textbook 7B of Junior High School* published by Erlangga. The discussion is concerned with some interpretations that are made based on the research findings.

A. Findings

Based on the data analysis, there are 451 occurrences of process types, 669 occurrences of participant functions, 669 occurrences of participant types, and 147 occurrences of circumstantial elements in mathematics texts of *Bilingual Mathematical Textbook 7B of Junior High School* published by Erlangga. The number of occurrences of process types is shown in Table 5.

Table 5: **The Number of Occurrences of Process Types in Mathematics Texts of *Bilingual Mathematical Textbook 7B of Junior High School* Published by Erlangga**

No	Process Type	Number	Percentage
1	Relational Process	218	48.34%
2	Material Process	214	47.45%
3	Mental Process	12	2.66%
4	Verbal Process	6	1.33%
5	Existential Process	1	0.22%
6	Behavioural Process	0	0%
TOTAL		**451**	**100%**

In Table 5, the most prominent process is Relational process. It has 218 occurrences or 48.34% of the total process types. The number of occurrences of Relational process is specified in Table 6.

Table 6: **Relational Process Types**

No	Relational Process	Number	Percentage
1	Relational Identifying Intensive	162	74.31%
2	Relational Attributive Intensive	52	23.85%
3	Relational Attributive Possessive	2	0.92%
4	Relational Identifying Possessive	2	0.92%
5	Relational Attributive Circumstantial	0	0%
6	Relational Identifying Circumstantial	0	0%
TOTAL		**218**	**100%**

Identifying Intensive seems to be the most prominent in Relational process. It has 162 occurrences (74.31%). The second prominent is Attributive Intensive mode. It has 52 occurrences (23.85%). Attributive Possessive and Identifying Possessive modes have the same number of occurrences that are 2 occurrences (0.92%). The last are Attributive Circumstantial and Identifying Circumstantial modes. There are no occurrences of them.

The second prominent process is Material process, which consists of 214 occurrences or 47.45% of the total process types. Mental process is on the third prominent process with 12 occurrences or 2.66% of the total process types. The fourth prominent process is Verbal process, which has 6 occurrences or 1.33% of the total process types. The fifth prominent process is Existential process. It has 1

occurrence or 0.22% of the total process types. The last is Behavioural process. There is no occurrence of it.

Besides the process, there are participants involved in the process and circumstances attendant on the process. There are 19 participant functions based on the process. They are Actor, Goal, Range, Recipient, Client, Agent, Senser, Phenomenon, Carrier, Attribute, Identified, Identifier, Sayer, Receiver, Verbiage, Target, Behaver, Behaviour, and Existent. The number of occurrences of participant functions in every process is shown in Table 7.

Table 7: **The Number of Occurrences of Participant Functions in Mathematics Texts of *Bilingual Mathematical Textbook 7B of Junior High School* Published by Erlangga**

No	Participant Function	Number	Percentage
1	Participant Functions of Relational Process	428	63.98%
2	Participant Functions of Material Process	216	32.29%
3	Participant Functions of Mental Process	15	2.24%
4	Participant Functions of Verbal Process	7	1.05%
5	Participant Functions of Existential Process	3	0.45%
6	Participant Functions of Behavioural Process	0	0%
TOTAL		**669**	**100%**

The participant functions of Relational process become the most prominent participants. They have 428 occurrences or 63.98% of the total participant functions. The number of occurrences of participant functions in Relational process is specified in Table 8.

Table 8: **Participant Functions of Relational Process**

No	Participant Function	Number	Percentage
1	Identified	160	37.38%
2	Identifier	160	37.38%
3	Carrier	54	12.62%
4	Attribute	54	12.62%
TOTAL		**428**	**100%**

Identified and Identifier dominate in occurrences with 160 occurrences or 37.38% of the total participant functions in Relational process. It is reasonable since Identifying mode is the most prominent in Relational process. Carrier and Attribute have 54 occurrences or 12.62% of the total participant functions in Relational process.

The participant functions of Material process become the second prominent participants, which have 216 occurrences or 32.29% of the total participant functions. The number of occurrences of participant functions in Material process is specified in Table 9.

Table 9: **Participant Functions of Material Process**

No	Participant Function	Number	Percentage
1	Goal	205	94.91%
2	Actor	11	5.09%
3	Range	0	0%
4	Recipient	0	0%
5	Client	0	0%
6	Agent	0	0%
TOTAL		**216**	**100%**

Goal dominates in occurrences with 205 occurrences or 94.91% of the total participant functions in Material process, followed by Actor with 11 occurrences (5.09%). There are no occurrences of Range, Recipient, Client, and Agent as the other participant functions in Material process.

The participant functions of Mental process become the third prominent participants, which have 15 occurrences or 2.24% of the total participant functions. The number of occurrences of participant functions in Mental process is specified in Table 10.

Table 10: **Participant Functions of Mental Process**

No	Participant Function	Number	Percentage
1	Phenomenon	12	80%
2	Senser	3	20%
TOTAL		**15**	**100%**

There are 12 occurrences or 80% of Phenonemon as the participant function of Mental process. It dominates in occurrences, followed by Senser with 3 occurrences or 20% of the total participant functions in Mental process.

The participant functions of Verbal process become the fourth prominent participants which have 7 occurrences or 1.05% of the total participant functions. The number of occurrences of participant functions in Verbal process is specified in Table 11.

Table 11: **Participant Functions of Verbal Process**

No	Participant Function	Number	Percentage
1	Verbiage	7	100%
2	Sayer	0	0%
3	Receiver	0	0%
4	Target	0	0%
TOTAL		**7**	**100%**

In Verbal process, the most frequent participant function is Verbiage. It has 7 occurrences or 100% of the total participant functions in Verbal process. Other participant functions in Verbal process such as Sayer, Receiver, and Target never occur in the texts.

The participant function of Existential process, that is Existent, becomes the fifth prominent participant. It has 3 occurrences or 0.45% of the total participant functions.

The participant functions of Behavioural process become the last prominent participants. There are no occurrences of Behaver and Behaviour.

Participant functions are specified based on their type. There are two types of participant functions: human and non-human. Table 12 shows the number of occurrences of participant types with non-human participant as mostly found. It takes 648 participants or 98.86% of the total participant types. Human participant has 21 participants or 3.14% of the total participant types.

Table 12: **The Number of Occurrences of Participant Types in Mathematics Texts of *Bilingual Mathematical Textbook 7B of Junior High School* Published by Erlangga**

No	Participant Function	Number	Percentage
1	Non-Human	648	98.86%
2	Human	21	3.14%
TOTAL		**669**	**100%**

Besides the participants, there are also circumstances around the process. According to Halliday (2004), the principle type of circumstantial elements in English are Extent and Location in time and space, including abstract space; Manner (means, quality, and comparison), Cause (reason, purpose, and behalf), Accompaniment (comitation and addition), Matter, and Role. Table 13 shows the number of occurrences of circumstantial elements of mathematics texts in *Bilingual Mathematical Textbook 7B of Junior High School* published by Erlangga.

Table 13: **The Number of Occurrences of Circumstantial Elements in Mathematics Texts of *Bilingual Mathematical Textbook 7B of Junior High School* Published by Erlangga**

No	Circumstantial Elements	Number	Percentages
1	Extent		
	Duration	0	0%
	Distance	1	0.68%
2	Location		
	Time	0	0%
	Place	60	40.82%
3	Manner		
	Means	52	35.34%
	Quality	7	4.76%
	Comparison	0	0%
4	Cause		
	Reason	0	0%
	Purpose	13	8.84%
	Behalf	0	0%
5	Accompaniment		
	Comitation	0	0%
	Addition	3	2.04%
6	Matter	0	0%
7	Role	11	7.48%
TOTAL		**147**	**100%**

In Table 13 there are 147 occurrences of circumstantial elements. Location of Place seems to be the most prominent in the circumstantial elements, which takes 60 occurrences or 40.82% of the total circumstantial elements.

There are 52 occurrences of Manner of Means or 35.34% of the total circumstantial elements, which make it the second prominent circumstantial element. The third prominent of circumstantial element is Cause of Purpose with 13 occurrences (8.84%), followed by Role, Manner of Quality, Accompaniment of Addition, and Extent of Distance with 11 occurrences (7.48%), 7 occurrences (4.76%), 3 occurrences (2.04%), and 1 occurrence (0.68%).

Extent of Duration, Location of Time, Manner of Comparison, Cause of Reason, Cause of Behalf, Accompaniment of Comitation, and Matter never occurs in the texts.

B. Discussion

1. The Result Concerning the Process Types

Based on the result of the analysis of mathematics texts in *Bilingual Mathematical Textbook 7B of Junior High School* published by Erlangga, the most prominent process type is Relational process. This means that the texts talk much about what the things are, what they are alike, and what they possess. Here, the things – or abstract objects – are numbers, symbols, sets, functions, and equations, because mathematics courses are procedural courses focusing on techniques for working with those abstract objects. This happens because the use of language in mathematics differs from the language of ordinary speech.

The other feature of mathematics text is that there is non-temporal – there is no past, present, or future in mathematics. Everything just “is”. Mathematical language is suffused with describing concepts. It is presented in the format of

definitions, theorems, and proofs. Thus, Relational process is dominant in mathematics texts. The examples of Relational process in the texts can be seen in Figures 17 (1), (2), (3), (4), (5), and (6):

(1)

$\angle ABC$	=	40°
Identified	Process: Relational	Identifier

(2)

{2, 4}	$\subset$	*{2, 4, 6}*
Carrier	Process: Relational	Attribute

(3)

6	$\in$	*{even numbers}*
Carrier	Process: Relational	Attribute

(4)

Line p	*//*	*line q*
Identified	Process: Relational	Identifier

(5)

S	=	*{1, 2, 3, 4, 5, 6}*
Identified	Process: Relational	Identifier

(6)

The following sentence	*is*	*true.*
Carrier	Process: Relational	Attribute

Figure 17: **The Examples of Relational Process in Mathematics Texts of *Bilingual Mathematical Textbook 7B of Junior High School* Published by Erlangga**

The clause in Figure 17 (1) expresses the notion that ∠ABC is identified by 40˚. Here, the mathematics symbol of = means *equal*. Figure 17 (2), (3), and (4) are other examples of mathematics symbols in mathematics texts of *Bilingual Mathematical Textbook 7B of Junior High School* Published by Erlangga. These symbols have many meanings; ⊂ means *the set 2 and 4 is the subset of the set 2, 4, and 6,* ∈ means *6 is a member of the set even numbers*, and // means *line p is parallel to line q*.

Clause in Figures 17 (5) and (6) are the examples of the differences between Identifying and Attributive mode. Clause in Figure 17 (5) is Identifying mode, which is reversible. *S is the set 1, 2, 3, 4, 5, and 6* can be switched into *the set 1, 2, 3, 4, 5, and 6 is S*. Meanwhile, clause in Figure 17 (6) is Attributive mode, which is not reversible. "*The following sentence is true*" cannot be switched into "*true is the following sentence"*.

Based on the result of the analysis illustrated in Table 8, it can be seen that the participants of Identified and Identifier are higher than Carrier and Attribute in occurrences. This means that the most prominent mode of Relational process is Identifying mode. Meanwhile, Attributive mode is the second prominent.

Material process becomes the second process after Relational process. Material process in mathematics texts of *Bilingual Mathematical Textbook 7B of Junior High School* published by Erlangga are much found in the forms of imperatives. It is reasonable since the texts which are taken to be analyzed are the exercises in *Bilingual Mathematical Textbook 7B of Junior High School* published by Erlangga. Imperatives refer to the special forms used to express command,

request or instruction. The basic message of an imperative clause is either *I want you to do something* (Halliday, 1994: 47). This indicates that the students are asked to do something. They are commanded to do the instruction in the exercises. The examples of Material process in the texts can be seen in Figures 18 (7) and (8):

(7)

Find	*the value of x and y*	*in each of the following parallelogram!*
Process: Material	Goal	Circusmtance: Location; Place

(8)

Build	*the corresponding Venn diagram!*
Process: Material	Goal

Figure 18: **The Examples of the Material Process in Mathematics Texts of *Bilingual Mathematical Textbook 7B of Junior High School* Published by Erlangga**

Mental, Verbal, and Existential processes rarely occur in the texts. This shows that the texts avoid the emotional content, the argumentative content, and the existential content. Furthermore, Behavioural process never occurs in the texts. This means that the texts never talk about physiological and psychological behaviour.

From the explanation above, it can be concluded that the dominant process type found in mathematics texts of *Bilingual Mathematical Textbook 7B of Junior High School* published by Erlangga is Relational process. This means that the texts talk much about what the things are, what they are alike, and what they

possess. Here, the things – or abstract objects – are numbers, symbols, sets, functions, and equations. This is in accordance with one of the characteristics of the language of mathematics that mathematical problem solving is suffused with describing concepts. Thus, it is presented in the format of definitions, theorems, and proofs. It is strengthened by the previous research done by Wignell, Martin, and Eggins (1993) that technical science and mathematics terms are most often introduced through a relation, such as *x is a y* is similar to the finding of this study.

2. The Result Concerning the Participant Functions and Types

Every process type is followed by participant functions. These participant functions are specified based on their type. There are two types of participant functions: human and non-human. Based on the result of the data analysis, it can be seen that the number of non-human participant in the text is the most prominent participant. This indicates that mathematical language mostly consists of non-human participants. They have unrestricted roles in the creation of the knowledge being developed. This also indicates that mathematics exists in non-human forms: the numbers, the points, the lines and planes, the symbols, and the geometric figures. The example of non-human participant in text can be seen in Figure 19 (9):

(9)

C	=	*{factors of 15}*
Identified	Process: Relational	Identifying

Figure 19: **The Example of Non-Human Participant in Mathematics Texts of *Bilingual Mathematical Textbook 7B of Junior High School* Published by Erlangga**

Related to the inherent participant functions characterizing mathematics texts in *Bilingual Mathematical Textbook 7B of Junior High School* published by Erlangga, it is found that the participant functions of Relational process are the most prominent participant functions. Identified and Identifier dominate in occurrences. This shows that the texts talk much about the things/the ones that are to be identified or the things/the ones that are given certain identities and the things/the ones that which serves as identity or the things/the ones that give certain identities. This may happen because the most prominent mode of Relational process characterizing mathematics texts in *Bilingual Mathematical Textbook 7B of Junior High School* published by Erlangga is Identifying mode, which has the meaning to characterize and to identify.

3. The Result Concerning the Circumstantial Elements

The most prominent circumstantial element found in mathematics texts of *Bilingual Mathematical Textbook 7B of Junior High School* published by Erlangga is the circumstantial element of Location of Place. This means that the texts talk much about the place where the process unfolds. The texts show the place where the students should do the exercises. They cannot do the exercise in

another area except what has been determined. This happens because mathematical problem solving is suffused with showing on where the students do the instruction. Thus, the circumstantial element of Location of Place is the most prominent found in mathematics texts. The example of Location of Place in mathematics texts of *Bilingual Mathematical Textbook 7B of Junior High School* published by Erlangga can be seen in Figure 20 (10):

(10)

Build	*the corresponding Venn diagram*	*and*	*shade*	*in the area representing* $V \cap F!$
Process: Material	Goal		Process: Material	Circumstance: Location; Place

Figure 20: **The Example of Location of Place in Mathematics Texts of *Bilingual Mathematical Textbook 7B of Junior High School* Published by Erlangga**

The next circumstantial element occurring in the texts after circumstantial of Location is Manner of Means. This indicates that the texts talk about the way in which the process is actualized. The texts show the way in which the students do the exercise. The example of Manner of Means can be demonstrated in Figure 21 (11):

(11)

Describe	*the following sets*	*by listing their members!*
Process: Material	Goal	Circusmtance: Manner; Means

Figure 21: **The Example of Manner of Means in Mathematics Texts of *Bilingual Mathematical Textbook 7B of Junior High School* Published by Erlangga**

The circumstantial elements of Role, Manner of Quality, Accompaniment of Addition, and Extent of Distance rarely occur in mathematics texts of *Bilingual Mathematical Textbook 7B of Junior High School* published by Erlangga. It can be seen from the percentages in Table 13. This means that the texts avoid: (i) the meaning of ‘be’ and ‘become’ circumstantially, (ii) expressions that characterize the process in respect of any variable that makes sense, (iii) entities that share the same participant functions, but one of them is presented circumstantially for purposes of contrast, and (iv) expressions of some unit of measurement.

The circumstances of Extent of Duration, Location of Time, Manner of Comparison, Cause of Reason, Cause of Behalf, Accompaniment of Comitation, and Matter never occur in texts. This shows that the texts never talk about: (i) entities with quantifier, (ii) the time when the process unfolds, (iii) expressions that are typically expressed by a prepositional phrase with *like* or *unlike*, or an adverbial group of similarity or difference, (iv) the reason for which a process takes place, (v) entities for whose sake the action is undertaken, (vi) entities that could be conjoined as a single element, and (vii) the element which corresponds to the interrogative “*what about”*.

CHAPTER V
CONCLUSION, IMPLICATIONS, AND SUGGESTIONS

A. Conclusion

Based on the findings and discussion, it can be concluded three important points:

1. The process type which has the highest frequency of occurrence and hence is regarded as typical process characterizing mathematics texts in *Bilingual Mathematical Textbook 7B of Junior High School* published by Erlangga is Relational process (48.34%). This means that the texts talk much about what the things are, what they are alike, and what they possess. Here, the things – or abstract objects – are numbers, symbols, sets, functions, and equations, because mathematics courses are procedural courses focusing on techniques for working with those abstract objects. This happens because the use of language in mathematics differs from the language of ordinary speech. The other feature of mathematics text is that mathematical language is suffused with describing concepts. It is presented in the format of definitions, theorems, and proofs. Thus, Relational process is dominant in mathematics texts of *Bilingual Mathematical Textbook 7B of Junior High School* published by Erlangga. Material process becomes the second prominent after Relational process. This process is mostly found in the forms of imperatives. It is reasonable since the texts which are taken to be analyzed are the exercises in *Bilingual Mathematical Textbook*.

Imperatives refer to the special forms used to express command, request or instruction. The basic message of an imperative clause is *I want you to do something* (Halliday, 1994: 47). This indicates that the students are asked to do something. They are commanded to do the instruction stated in the exercises. It is followed by, Mental, Verbal, Existential, and Behavioural processes respectively.

2. From the point of the inherent participant functions, Identified and Identifier which are participant functions of Relational process are the most two prominent participant functions (37.38%). They are regarded as the inherent participant functions characterizing mathematics texts in *Bilingual Mathematical Textbook 7B of Junior High School* published by Erlangga. This shows that the texts talk much about the things/the ones that are to be identified or the things/the ones that are given certain identities and the things/the ones that which serves as identity or the things/the ones that give certain identities. This may happen because the most prominent mode of Relational process characterizing mathematics texts in *Bilingual Mathematical Textbook 7B of Junior High School* published by Erlangga is Identifying mode, which has the meaning to characterize and to identify. They are followed by participant functions of Material process, Mental process, Verbal process, Existential process, and Behavioural process respectively. From the point of the participant types, the non-human participant is the most prominent participant type (98.86%). This indicates that mathematical language mostly consists of

non-human participants. They have unrestricted roles in the creation of the knowledge being developed. This also indicates that mathematics exists in non-human forms: the numbers, the points, the lines and planes, the symbols, and the geometric figures.

3. In accordance with the circumstantial elements, the circumstance of Location of Place dominates the circumstantial elements (40.82%). It is followed by the circumstances of Manner of Means, Cause of Purpose, Role, Manner of Quality, Accompaniment of Addition, Extent of Distance, Extent of Duration, Location of Time, Manner of Comparison, Cause of Reason, Cause of Behalf, Accompaniment of Comitation, and Matter respectively. Location of place is dominant in occurrences. This means that the texts talk much about the place where the process unfolds. The texts show the place where the students should do the exercises. They cannot do the exercise in another area except what has been determined. This happens because mathematical problem solving is suffused with showing on where the students do the instruction.

B. Implications

From the findings of this study, it can be found the characteristics of mathematics texts in *Bilingual Mathematical Textbook 7B of Junior High School* published by Erlangga. These characteristics of mathematics texts can be explained as follows:

1. Mathematics texts talk much about what the things are, what they are alike, and what they possess. Here, the things – or abstract objects – are numbers, symbols, sets, functions, and equations, because mathematics courses are procedural courses focusing on techniques for working with those abstract objects.
2. Mathematical language is suffused with describing concepts. It is presented in the format of definitions, theorems, and proofs. This is shown by the findings of this study that mathematics texts talk much about the things that are to be identified or the things that are given certain identities and the things that serve as identity or the things that give certain identities.
3. Mathematical language mostly consists of non-human participants. They have unrestricted roles in the creation of the knowledge being developed. Mathematics exists in non-human forms: the numbers, the points, the lines and planes, the symbols, and the geometric figures.
4. Mathematical problem solving is suffused with showing on where the readers do the instruction. This is shown by the findings of this study that mathematics texts talk much about the place where the process unfolds.

There are some implications in reference to the conclusion. First, it can be known the characteristics of mathematics texts in *Bilingual Mathematical Textbook 7B of Junior High School* published by Erlangga. These characteristics has been presented above.

Second, it is expected that the teachers can use the findings as an input to introduce the texts and as their supplies to help them know types of texts. Thus, they will teach their students using the texts based on their level of difficulties.

Finally, the teachers also can use the findings as their supplies to determine types of texts which are appropriate for the students based on their level of competency and to determine the easiest method for explaining mathematics texts in details, so that the texts can be understood easily.

C. Suggestions

The result of this research can lead to the suggestion to some parties as follows:

1. Teachers

Teachers should understand the texts carefully in order to determine types of texts which are appropriate for the students based on the level of difficulties of the texts and based on the students' level competency.

2. Other researchers

This study has not discussed all aspects of the characteristics of the texts. In accordance with this problem, the researcher gives the suggestion to other researchers that they can conduct another analysis to find the characteristics of mathematics texts, for example, from the logical meaning etc.

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APPENDICES

Appendix I: The Analysis of Process Types of Mathematics Texts in Chapter 6 of *Bilingual Mathematical Textbook 7B of Junior High School* Published by Erlangga

No	Clause Expressions	Process Types										
		Mat	Men	RAI	RII	RAC	RIC	RAP	RIP	Ver	Bh	Ext
1	Which of the following groups and collections are considered as sets?		1									
2	Explain your answer!									1		
3	Give five instances of groups which serve as sets, and name four members of each group!	2										
4	Express the following sets using braces!	1										
5	M is a set of students in your class who are 13 years old.			1								
6	T is a set of even counting numbers which are less than 14.			1								
7	Tell whether each of the following sentences is *true* or *false*!									1		
8	5 ∈ {1, 3, 5, 7}			1								
9	6 ∈ {even numbers}			1								
10	16 ∈ {2, 4, 6, 8, . . . , 20}			1								
11	Achmad Yani ∈ {heroes of the revolution}			1								
12	3 ∈ {333}			1								
13	∈ {capital letters}			1								
14	Semeru ∈ {volcanoes}			1								
15	A = {natural numbers which are less than 6}.				1							
16	B = {natural numbers which are multiples of 3, but less than 100}.				1							
17	Complete the following sentences with the symbol ∈ or ∉ so that they become true sentences!	1										
18	Use the symbol ∈ to match the available elements with the available sets so that they become true sentences!	2										
19	Determine the number of members of each of the following sets!		1									
20	M = {prime numbers which are less than 20}.				1							
		6	2	9	3	0	0	0	0	2	0	0

No	Clause Expressions	Process Types										
		Mat	Men	RAI	RII	RAC	RIC	RAP	RIP	Ver	Bh	Ext
21	N = {letters which form the word "makanan"}.				1							
22	Describe each of the following sets by listing all its members inside braces!	1										
23	A = {counting numbers which are more than 3 and less than 10}				1							
24	B = {odd numbers which are evenly divisible by 5 and less than 60}				1							
25	C = {letters which occur only once in the word "matematika"}				1							
26	D = {p I 2 p 9, $p \in A$}, where A is the set of all natural numbers.				1							
27	E = {x I -2 $2x$ 10, x is an integer}			1	1							
28	P = {odd counting numbers which are less than 16 and evenly divisible by 3}				1							
29	Describe the above set P by set-builder notation!	1										
30	Describe the above set P by extention (listing all of its members)!	1										
31	Describe each of the following sets by words and set-builder notation!	1										
32	For S = {1, 2, 3, 4, . . . , 11}, describe the following sets by listing their members!	1										
33	For M = {2, 4, 6, 8, 10}, build a set R whose members the members of M multiplied by one half!	1										
34	Which of the following sets is an empty set?			1								
35	Describe one possible universal set for each of the following sets!	1										
36	Build a Venn diagram for the following sets!	1										
37	S = {1, 2, 3, 4, 5, 6}				1							
38	P = {1, 2} and Q = {4, 5}				2							
39	S = {a, b, c, d, e, f }				1							
40	F = {a, b, c, d, } and G = {a, d, e }				2							
		8	0	2	13	0	0	0	0	0	0	0

No	Clause Expressions	Process Types										
		Mat	Men	RAI	RII	RAC	RIC	RAP	RIP	Ver	Bh	Ext
41	S = {natural numbers which are less than 15}				1							
42	A = {odd natural numbers which are less than 10}				1							
43	B = {even natural numbers between 1 and 11}				1							
44	C = {prime numbers which are less than 10}				1							
45	Build a Venn diagram for each of the following collections of sets with S as their universal set!	1										
46	Build a Venn diagram for the following sets:	1										
47	S = {all students in your class}				1							
48	A = {students in your class who wear glasses}				1							
49	B = {left-handed students in your class}				1							
50	S = {counting numbers}				1							
51	A = {odd counting numbers}				1							
52	B = {even counting numbers}				1							
53	C = {prime numbers}				1							
54	Build a Venn diagram for each of the following collections of sets with S as their universal set!	1										
55	From the above Venn diagram, describe the sets specified below by listing their members!	1										
56	The following diagram is a Venn diagram for the sets:			1								
57	S = {all students in grade VII-A}				1							
58	P = {students in class VII-A who like science}				1							
59	M = {students in class VII-A who like math}				1							
60	Determine the numbers of students!		1									
		4	1	1	14	0	0	0	0	0	0	0

No	Clause Expressions	Process Types										
		Mat	Men	RAI	RII	RAC	RIC	RAP	RIP	Ver	Bh	Ext
61	Describe each of the following subsets of A = {1, 3, 5, 7, 9} by listing its members!	1										
62	Tell whether each of the following sentences is *true* or *false*!									1		
63	{2, 4} ⊂ {2, 4, 6}			1								
64	{k, l } ⊂ {h, i, k, l, m }			1								
65	p ⊂ {p, q, r }			1								
66	{d, e, f } ⊂ {d, e, f }			1								
67	{Ø} ⊂ {0, 100}			1								
68	{ } ⊂ {0}			1								
69	Write the relationship between each pair of the following sets using the ⊂ notation!	1										
70	A = {a, i, u, e, o }				1							
71	B = {2, 4, 6, 8, . . .}				1							
72	C = {100}				1							
73	D = {i, a, e }				1							
74	E = {100, 101}				1							
75	F = {i, e }				1							
76	For S = {1, 2, 3, 4, 5, 6}, describe the following subsets of S by extention!	1										
77	Describe all possible subsets of P = {2, 3, 4, 5, 7, 11} specified below!	1										
78	Write down all subsets of {a, b }!	1										
79	Write down 6 subsets of {pencil, compass, book}!	1										
80	Write down the subsets of M = {a, b, c, d } which have two members, and find their number!	2										
		8	0	6	6	0	0	0	0	1	0	0

No	Clause Expressions	Process Types										
		Mat	Men	RAI	RII	RAC	RIC	RAP	RIP	Ver	Bh	Ext
81	Write down the subsets of $M = \{a, b, c, d\}$ which have three members, and find their number!	2										
82	Find the number of all possible subsets from each of the following sets!	1										
83	$P = \{y \mid y \quad 8, y \in A\}$, A is a set of natural numbers!			1	1							
84	$Q = \{p \mid -2 \quad p \quad 5, p \in B\}$, B is a set of integers!			1	1							
85	Write down all subsets of K = {factors of 16}!	1										
86	$P = \{a, b, c, d, e, f\}$				1							
87	$Q = \{b, c, d\}$				1							
88	$R = \{d, e, f, g\}$				1							
89	List each member of P ⋂ Q	1										
90	V = {vowels}				1							
91	$F = \{u, c, o, k, m, a, i, n\}$				1							
92	Describe $V \cap F$ by listing its members!	1										
93	What is the relationship between $V \cap F$ and V?				1							
94	Build the corresponding Venn diagram and shade in the area representing $V \cap F$!	2										
95	S = {all counting numbers}				1							
96	$K = \{x \mid x \quad 20, x$ is an odd counting number}			1	1							
97	$L = \{x \mid x \quad 20, x$ is an even counting number}			1	1							
98	$M = \{x \mid x \quad 20, x$ is a prime number}			1	1							
99	Describe each of the following intersections of sets by listing its members!	1										
100	A = {Indonesians who are at least 21 years old}			1	1							
		9	0	6	13	0	0	0	0	0	0	0

No	Clause Expressions	Process Types										
		Mat	Men	RAI	RII	RAC	RIC	RAP	RIP	Ver	Bh	Ext
101	M = {members of Indonesian Legislative Assembly}				1							
102	Build a Venn diagram and shade in the area representing $A \cap M$!	2										
103	A = {prime factors of 330}				1							
104	B = {common factors of 24 and 60}				1							
105	C = {odd counting numbers which are less than 11}				1							
106	Describe each of the following intersections of sets by listing its members!	1										
107	With the set of all natural numbers as the universe, show each of those intersections in a separate diagram,	1										
108	and shade in the intersection are!	1										
109	S = {integers}				1							
110	$P = \{x \mid -2 \quad x \quad 6\}$				1							
111	$Q = \{x \mid -1 \quad x \quad 8\}$				1							
112	$R = \{x \mid -3 \quad x \quad 9\}$				1							
113	By listing its members, describe $P \cap Q \cap R$!	1										
114	Describe the union of each of the following pairs of sets and shade in the area representing the union in its corresponding Venn diagram!	2										
115	$A = \{1, 2, 3, 4, 5\}$				1							
116	$B = \{3, 5, 7, 9\}$				1							
117	$E = \{2, 4, 6, 8, 10\}$				1							
118	$F = \{4, 8, 2, 6, 10\}$				1							
119	A = {natural numbers which are less than 7}				1							
120	B = {odd numbers which are less than 8 and evenly divisible by 3}				1							
		8	0	0	14	0	0	0	0	0	0	0

No	Clause Expressions	Process Types										
		Mat	Men	RAI	RII	RAC	RIC	RAP	RIP	Ver	Bh	Ext
121	C = {factors of 15}				1							
122	Describe each of the following unions of sets by listing its members!	1										
123	M = {counting numbers which are multiples of 2 and less than 15}				1							
124	N = {counting numbers which are multiples of 4 and less than 12}				1							
125	Describe $M \cup N$ by listing its members!	1										
126	Determine $n(M \cup N)$!		1									
127	Build the corresponding Venn diagram and shade in the area representing $M \cup N$!	2										
128	With the set of all natural numbers as the universe, describe each of the following sets by listing its members!	1										
129	D = {x I 1 x 8}				1							
130	E = {x I 3 x 10}				1							
131	F = {x I 2 x 8}				1							
132	Find the results of the following operations on sets!	1										
133	A = {x I 0 x 7}				1							
134	B = {x I -3 x 5}				1							
135	C = {x I -1 x 8}				1							
136	With the set of all integers as the universe, find $A \cup B \cup C$!	1										
137	Find $A \cap B \cap C$!	1										
138	A = {a, b, c, d, e, f }				1							
139	B = {c, f, g, h, i, j }				1							
140	Describe the following differences of sets!	1										
		9	1	0	11	0	0	0	0	0	0	0

No	Clause Expressions	Process Types										
		Mat	Men	RAI	RII	RAC	RIC	RAP	RIP	Ver	Bh	Ext
141	Determine the relationship between the sets P and Q if P - Q = { }		1		1							
142	From the above Venn diagram, desribe A - B	1										
143	S = {1, 2, 3, 4, 5, 6, 7}				1							
144	A = {1, 2, 3, 6}				1							
145	Describe A' by listing its members!	1										
146	From the figure below, describe each of the following sets by listing its members!	1										
147	Using the following diagram, shade in the area representing each of the following sets in a separate diagram!	1										
148	Each area marked with a number from I to IV in the following diagram represents one set.	1										
149	Match each of the following sets with one of the above areas!	1										
150	In a group of children, there are 20 children who like milk											1
151	15 children like tea		1									
152	12 children like both beverages		1									
153	and 7 children like neither milk nor tea		1									
154	Build a Venn diagram based on the above information!	1										
155	How many children are there in that group!											1
		7	4	0	3	0	0	0	0	0	0	2

Appendix II: The Analysis of Process Types of Mathematics Texts in Chapter 7 of*Bilingual Mathematical Textbook 7B of Junior High School* Published by Erlangga

No	Clause Expressions	Process Types										
		Mat	Men	RAI	RII	RAC	RIC	RAP	RIP	Ver	Bh	Ext
1	Do the following unit conversation!	1										
2	Express the results of the following additions in degrees!	1										
3	Find the results of the following additions and subtractions!	1										
4	Look at the following figure!		1									
5	Based on the figure, name the following angles using three letters!	1										
6	Using three letters, name all the angles which have the following lines as one of their rays!	1										
7	Construct the following angles using a protractor!	1										
8	$\angle ABC = 40^\circ$				1							
9	$\angle GHK = 115^\circ$				1							
10	$\angle STU = 67^\circ$				1							
11	$\angle AOB = 164^\circ$				1							
12	Use your protractor to measure each of the following angles.	2										
13	Write your results as, for example$\angle XYZ = 70^\circ$	1										
14	By using a compass and a ruler, duplicate each of the following angles!	1										
15	Duplicate and bisect each of the following angles using a compass and a ruler!	2										
16	In the above ΔABC, bisect $\angle A$, $\angle B$, and $\angle C$!	1										
17	Draw a sketch for each of the following angles!	1										
18	Take a look at a clock face.		1									
19	How many right angles does the second hand rotate through if it moves from 12 to 12?	2										
20	A wheel of a bicycle completes 4 full turns.			1								
		16	2	1	4	0	0	0	0	0	0	0

No	Clause Expressions	Process Types										
		Mat	Men	RAI	RII	RAC	RIC	RAP	RIP	Ver	Bh	Ext
21	Construct the following angles using a compass and a ruler!	1										
22	Construct $\angle RST = 22{,}5^\circ$ on the following line!	1										
23	Using a compass and a ruler, construct a 120° angle	1										
24	Using a compass and a ruler, divide the 120 angle into 4 equal angles!	1										
25	Label each of the following angles as an acute angle or an obtuse angle!	1										
26	Label each of the following angles as an acute angle, a right angle, an obtuse angle, or a reflex angle!	1										
27	Show acute angles as many as you can find in the above figure!	1										
28	Show obtuse angles as many as you can find in the above figure!	1										
29	If the measure of $\angle BOC = 80^\circ$, find the measure of $\angle AOC$!	1			1							
30	If $y = 130$, find x!	1			1							
31	If $x = 74$, find y!	1			1							
32	Find the supplements of 15°	1										
33	Find the values of a and b!	1										
34	Find the measure of $\angle ABD$ and $\angle PQS$!	1										
35	The measure of an angle is 5 times the measure of its supplement.			1								
36	Find the measure of that angle!	1										
37	The ratio of the measure of an angle to the measure of its supplement is 2 : 3.				1							
38	If $x = 35$, then find the value of y!	1			1							
39	If $y = 62$, then find the value of x!	1			1							
40	If $x = 0$, then find the value of y!	1			1							
		18	0	1	7	0	0	0	0	0	0	0

No	Clause Expressions	Process Types										
		Mat	Men	RAI	RII	RAC	RIC	RAP	RIP	Ver	Bh	Ext
41	Find the measure of the complement of each of the following angles!	1										
42	If the measure of $\angle A$ is twice the measure of its complement, find the measure of $\angle A$!	1		1								
43	If the measure of the complement of $\angle B$ is 1½ times the measure of $\angle B$, find the measure of $\angle B$!	1		1								
44	Show two pairs of opposite angles!	1										
45	Show the pairs of opposite angles as many as you can find!	1										
46	Find the measure of $\angle BOC$	1										
47	In the figure below, find the values of a, b, and c!	1										
48	In the above figure, show the intersection point between each of the following pairs of lines!	1										
49	Look at the above picture of a cuboid.		1									
50	Show four edged which are vertical lines!	1										
51	Tell whether the following statements are *true* or *false*!									1		
52	It is impossible for two horizontal lines to be perpendicular to each other.			1								
53	If a vertical line and a horizontal line meet, then both lines will form four right angles.	2										
54	It is impossible for two vertical lines to be perpendicular to each other.			1								
55	If two lines are perpendicular to each other, then one of them must be a vertical line while the other must be a horizontal line.			2								
56	If there is a horizontal line, any line which is perpendicular to it must be a vertical line.			1								1
57	Show all edges which are in a vertical direction!	1										
58	In the above figure, find two pairs of parallel lines!	1										
59	From the above figure, show the line which is parallel to each of the following lines!	1										
60	From the above cuboid $ABCD.EFGH$, find the edges which are parallel to each of the following edges!	1										
		15	1	7	0	0	0	0	0	1	0	1

No	Clause Expressions	Process Types										
		Mat	Men	RAI	RII	RAC	RIC	RAP	RIP	Ver	Bh	Ext
61	Line p // line q. If line r intersects line p, then line r also intersects line q.				3							
62	If line k intersects line l, then line k intersects line m.				2							
63	If line a and line b pass through point P and both lines are parallel to line g, then line a and line b are coincident.	1		1	1							
64	In the above figure, line p // line q are intersected by a line r.				1							
65	Tell the numbers which label the corresponding angles!									1		
66	In the above figure, find three pairs of corresponding angles!	1										
67	In the above figure, find four pairs of alternate interior angles!	1										
68	In the above figure, $\angle SPQ = 70^\circ$				1							
69	Find the measure of each of the following angles!	1										
70	The above figure shows a staircase with parallel posts.				1							
71	Find the values of p and q in the following figure!	1										
72	In the above figure, AC // FE, and $\angle DBC = 115^\circ$				2							
73	Find the measure of $\angle ABE$!	1										
		6	0	1	11	0	0	0	0	1	0	0

Appendix III: The Analysis of Process Types of Mathematics Texts in Chapter 8 of *Bilingual Mathematical Textbook 7B of Junior High School* Published by Erlangga

No	Clause Expressions	Process Types										
		Mat	Men	RAI	RII	RAC	RIC	RAP	RIP	Ver	Bh	Ext
1	Draw a rectangle $PQRS$ with its diagonals and then show the two pairs of parallel sides!	2										
2	In the above figure, $DEFG$ is a rectangle.			1								
3	Find the value of a!	1										
4	In a rectangle $KLMN$, the length of KL = 6 cm, MN = $3y$ cm, and the measure of $\angle LKN = 5n^\circ$.				3							
5	Find the value of y!	1										
6	Draw a rectangle $ABCD$ whose diagonals intersect at point O.	1										
7	If the length of AC = 10 cm, find the length of BD!	1			1							
8	The length of each diagonal in a rectangle is $(4x - 3)$ cm and $(2x + 7)$ cm				1							
9	Find the value of x!	1										
10	From the above square $PQRS$, show three lines which have the same length as PQ!	1										
11	In a square $ABCD$, the length of the diagonal AC = 15 cm and the length of the diagonal BD = $(2x + 7)$ cm.				2							
12	Draw a square $DEFG$ whose diagonals intersect at a point H.	1										
13	If the length of DE = 12 cm, and the length of the diagonal DF = 17 cm, find the lengths of DG and GF!	1			2							
14	Nine squares whose sides have length 12 cm are arranged so as to form a bigger square.	1										
15	Make a drawing of that square!	1										
16	What is the length of each side of the new bigger square!				1							
17	A rectangle is 8 cm long and 5 cm wide. Find its perimeter!	1		1								
18	The perimeter of a rectangle = 60 cm and its length = 20 cm. Find its width!	1			2							
19	Find the perimeter of a square whose sides have length 15 cm!	1										
20	The perimeter of a square = 80 cm.				1							
		15	0	2	13	0	0	0	0	0	0	0

No	Clause Expressions	Process Types										
		Mat	Men	RAI	RII	RAC	RIC	RAP	RIP	Ver	Bh	Ext
21	Find the length of each of its sides!	1										
22	The perimeter of a rectangle = 100 cm.				1							
23	The ratio of its length to its width is 3 : 2.				1							
24	Find its length and width!	1										
25	The perimeter of a square is equal to the perimeter of a rectangle.				1							
26	If the perimeter of the square = 40 cm and the width of the rectangle = 5 cm, then find the length of the rectangle!	1			2							
27	Find the perimeter of the shaded area in each of the following figures!	1										
28	Find the area of the rectangle whose length and width measure 6 cm and 4 cm!	1										
29	The area of a rectangle = 150 cm² and its width = 10 cm. Find its length!	1			2							
30	Find the area of the square whose sides have the following length!	1										
31	The perimeter of a square is 48 cm. Find its area!	1			1							
32	The area of a square is = 64 cm².				1							
33	Find the length of each of its sides!	1										
34	$KLMN$ is a parallelogram whose diagonals intersect at a point T.			1								
35	Name two pairs of parallel lines!	1										
36	Name four pairs of lines which are equal in length!	1										
37	Name two pairs of interior angles which are equal in measure!	1										
38	Duplicate the following parallelograms, and then find the length of each unknown side and the measure of each unknown angle!	2										
39	Find the values of x and y in each of the following parallelogram!	1										
40	PQ and RS are two straight lines which intersect at their midpoints O.			1								
		15	0	2	9	0	0	0	0	0	0	0

No	Clause Expressions	Process Types										
		Mat	Men	RAI	RII	RAC	RIC	RAP	RIP	Ver	Bh	Ext
41	Is $PQRS$ a parallelogram?			1								
42	The ratio of the measure of an angle to that of an adjacent angle in a parallelogram is 2 : 3.				1							
43	Find the measure of each of the interior angles in that parallelogram!	1										
44	Find the area of each of the following parallelogram!	1										
45	The length of the base of a parallelogram = $4y$ cm and its altitude = $3y$ cm.				2							
46	If the area of that parallelogram is 192 cm², find the lengths of its base and altitude!	1			1							
47	Write down two formulas for the area of the above parallelogram $ABCD$!	1										
48	Find the area of the parallelogram $ABCD$!	1										
49	Find the length of CE using an equation formed from those formulas!	2										
50	Draw a parallelogram $PQRS$ with the length of PQ = 6 cm and the magnitude of $\angle QPS = 60^\circ$	1			2							
51	Draw the altitude ST and then measure its length to the nearest mm!	2										
52	Find the area of that parallelogram!	1										
53	Duplicate the following rhombi and write the measure of each interior angle in each figure!	2										
54	In a rhombus $EFGH$, the length of side $EF = (5x - 3)$ cm and that of side $GH = (2x + 3)$ cm.				2							
55	Find the length of each side of that rhombus!	1										
56	Tell whether each of the following statements is true or false for every rhombus!									1		
57	All sides are equal in length.			1								
58	The two diagonals are equal in length.			1								
59	The two diagonals bisect each other.	1										
60	In the rhombus $ABCD$ above, find the value of x!	1										
		16	0	3	8	0	0	0	0	1	0	0

No	Clause Expressions	Process Types										
		Mat	Men	RAI	RII	RAC	RIC	RAP	RIP	Ver	Bh	Ext
61	In a rhombus $ABCD$, $AC : BD = 4 : 3$.				1							
62	If the rhombus area is 150 cm², find the length of the diagonals AC and BD!	1			1							
63	Find the area of the rhombus whose diagonals are 9 cm and 12 cm long!	1										
64	Draw a kite ABCD and its diagonals, and then mark the lines and angles which have the same measure!	2										
65	Duplicate the following kites and write the measure of each interior angle!	2										
66	Tell whether each of the following statements is true or false for every kite!									1		
67	The diagonals are equal in length.			1								
68	The diagonals intersect at a right angle.				1							
69	Every kite has two pairs of sides with the same length.							1				
70	The opposite interior angles are equal in measure.			1								
71	Find the area of each of the following kites!	1										
72	The area of kite is 60 cm²				1							
73	If the length of one of its diagonals is 8 cm, find the length of the other diagonal!	1			1							
74	Find the shaded figure in the above figure!	1										
75	Duplicate the following trapeziums and then write the measure of each interior angle!	2										
76	In an isosceles trapezium $ABCD$, the length of $AD = BC$, and the measure of $A = 60^\circ$				2							
77	Find the measure of each of $\angle B$!	1										
78	Find the area of each of the following trapeziums!	1										
79	The ratio of the lengths of parallel opposite sides of a trapezium is 4 : 3.				1							
80	If the altitude of the trapezium is 8 cm, and its area is 84 cm², then find the lengths of the parallel sides!	1			2							
		14	0	2	10	0	0	1	0	1	0	0

No	Clause Expressions	Process Types										
		Mat	Men	RAI	RII	RAC	RIC	RAP	RIP	Ver	Bh	Ext
81	A rectangular garden measures 9 m x 6 m.			1								
82	If lamp posts are to be installed at the perimeter of that garden with a distance of 3 m between every two posts, then how many lamp posts are required?	2										
83	The following figure shows a square boxing ring with sides measuring 6 m each.				1							
84	Three strands of protecting rope are fastened around its perimeter.	1										
85	Find the perimeter of that boxing ring!	1										
86	How many meters of rope are required?	1										
87	The above figure shows a badminton field.				1							
88	That field is to be concreted at a cost of Rp60,000/m².			1								
89	What is the total cost for concreting the whole field?				1							
90	The above figure shows a roof of a house which consists of a pair of trapeziums and a pair of triangles.				1				1			
91	If every m² of the roof requires 20 roof-tiles, then how many roof-tiles are required to cover the whole roof?	3										
92	The above figure shows the interior of a room.				1							
93	The door measures 0.9 m x 2 m, and the window measures 1.5 m x 1.5 m.			2								
94	How many bricks are required to construct the room if every m² of the wall requires 70 bricks?	3										
		11	0	4	5	0	0	0	1	0	0	0

Appendix IV: The Analysis of Process Types of Mathematics Texts in Chapter 9 of *Bilingual Mathematical Textbook 7B of Junior High School* Published by Erlangga

No	Clause Expressions	Process Types										
		Mat	Men	RAI	RII	RAC	RIC	RAP	RIP	Ver	Bh	Ext
1	Among the following figures, which figure is an acute triangle?			1								
2	Look at the following figure!		1									
3	Name two isosceles triangles which have PO as one of their sides!	1						1				
4	The above figure is an isosceles triangle ΔPQR.			1								
5	The lengths of PR = 15 cm and QS = 8 cm.				2							
6	Name two triangles which form ΔPQR!	1										
7	What are the lengths of PQ, SR, and QR?				1							
8	The following figures are isosceles triangles.			1								
9	Duplicate these figures and write down the unknown lengths of their sides and the unknown measures of their interior angles!	2										
10	Each of the following figures consist of two congruent isosceles triangles.								1			
11	In the above figure, ΔABC is an equilateral triangle in which the length of AB = 6 cm.			1								
12	Find the lengths of AC, BC, and BD!	1										
13	The above figure shows a tessellation with equilateral triangles in which the length AB = 1 cm.				1							
14	How many equilateral triangles whose sides have lengths of 1 cm can you find?	1										
15	What is the total number of equilateral triangles?				1							
16	The above figure shows six congruent equilateral triangles which are laid side by side such that they form a regular hexagon.				1							
17	What is the measure of $\angle AOB$?				1							
18	Name 11 lines which have the same length as AB!	1										
19	By using your compass and ruler, construct the perpendicular to the line XY through the point P!	1										
20	Construct an altitude through the vertex A in ΔABC if $\angle A$ is an acute angle!	1		1								
		9	1	5	7	0	0	1	1	0	0	0

No	Clause Expressions	Process Types										
		Mat	Men	RAI	RII	RAC	RIC	RAP	RIP	Ver	Bh	Ext
21	Construct the perpendicular to the line AB through the point Q!	1										
22	Construct a rhombus $ABCD$ in which the length of the diagonal AC = 5 cm and the diagonal BD = 8 cm!	1										
23	By using your protractor, measure each of the angles which you have constructed!	1										
24	Construct ΔABC in which $\angle A = 90^\circ$, AB = 5 cm, and AC = 3 cm!	1										
25	Find the measure of the third angle in a triangle if its two angles are given as follows!	2										
26	The ratio of the measures of angles in a triangle is 2 : 3 : 4.				1							
27	Find the measure of each angle in that triangle!	1										
28	Find the values of m and n in the following figure!	1										
29	The measures of angles in a triangle are given by x°, $(40 + 3x)^\circ$, and $(30 + x)^\circ$.	1										
30	Find the value of x!	1										
31	Which of the following sets of three lines can be used to form a triangle?	2										
32	In the above figure, $\angle BAC = 60^\circ$ and $\angle CBD = 140^\circ$.				2							
33	Find the measure of $\angle ACB$!	1										
34	Find the perimeter of a triangle whose sides are 15 cm, 12 cm, and 18 cm!	1										
35	Find the perimeter of an equilateral triangle whose one of its sides is 16 cm long!	1										
36	In an isosceles triangle ABC, $AB = AC$, AB = 10 cm, and BC = 8 cm.				3							
37	Find the perimeter of the triangle!	1										
38	Find the areas of the triangles with the following measures!	1										
39	The area of a triangle is 120 cm² and its base is 30 cm.				2							
40	Find its altitude!	1										
41	Find the length of the base of a triangle whose area is 90 cm² and altitude is 18 cm!	1										
42	In the following ΔABC, the length of AB = 8 cm, AC = 6 cm, and BC = 10 cm.				3							
43	Find the area of ΔABC!	1										
		20	0	0	11	0	0	0	0	0	0	0

Appendix V: The Analysis of Participant Functions of Mathematics Texts in Chapter 6 o*Bilingual Mathematical Textbook 7B of Junior High School* Published by Erlangga

No	Clause Expressions	Participant Functions																		
		Act	Gl	Rec	Cl	Rg	Agn	Sns	Phe	Car	Att	Id	Ir	Sy	Rcv	Vb	Tg	Bhv	Bho	Ex
1	Which of the following groups and collections are considered as sets?								1											
2	Explain your answer!															1				
3	Give five instances of groups which serve as sets, and name four members of each group!		2																	
4	Express the following sets using braces!		1																	
5	M is a set of students in your class who are 13 years old.									1	1									
6	T is a set of even counting numbers which are less than 14.									1	1									
7	Tell whether each of the following sentences is *true* or *false*!															1				
8	5 ∈ {1, 3, 5, 7}									1	1									
9	6 ∈ {even numbers}									1	1									
10	16 ∈ {2, 4, 6, 8, . . . , 20}									1	1									
11	Achmad Yani ∈ {heroes of the revolution}									1	1									
12	3 ∈ {333}									1	1									
13	∈ {capital letters}									1	1									
14	Semeru ∈ {volcanoes}									1	1									
15	A = {natural numbers which are less than 6}.											1	1							
16	B = {natural numbers which are multiples of 3, but less than 100}.											1	1							
17	Complete the following sentences with the symbol ∈ or ∉ so that they become true sentences!		1																	
18	Use the symbol ∈ to match the available elements with the available sets so that they become true sentences!		2							1	1									
19	Determine the number of members of each of the following sets!								1											
20	M = {prime numbers which are less than 20}.											1	1							
		0	6	0	0	0	0	0	2	10	10	3	3	0	0	2	0	0	0	0

No	Clause Expressions	Participant Functions																		
		Act	Gl	Rec	Cl	Rg	Agn	Sns	Phe	Car	Att	Id	Ir	Sy	Rcv	Vb	Tg	Bhv	Bho	Ex
21	N = {letters which form the word "makanan"}.											1	1							
22	Describe each of the following sets by listing all its members inside braces!		1																	
23	A = {counting numbers which are more than 3 and less than 10}											1	1							
24	B = {odd numbers which are evenly divisible by 5 and less than 60}											1	1							
25	C = {letters which occur only once in the word "matematika"}	1										1	1							
26	D = {p I 2 p 9, p ∈ A }, where A is the set of all natural numbers.											1	1							
27	E = {x I -2 2x 10, x is an integer}									1	1	1	1							
28	P = {odd counting numbers which are less than 16 and evenly divisible by 3}											1	1							
29	Describe the above set P by set-builder notation!		1																	
30	Describe the above set P by extention (listing all of its members)!		1																	
31	Describe each of the following sets by words and set-builder notation!		1																	
32	For S = {1, 2, 3, 4, . . . , 11}, describe the following sets by listing their members!		1																	
33	For M = {2, 4, 6, 8, 10}, build a set R whose members the members of M multiplied by one half!		1																	
34	Which of the following sets is an empty set?									1	1									
35	Describe one possible universal set for each of the following sets!		1																	
36	Build a Venn diagram for the following sets!		1																	
37	S = {1, 2, 3, 4, 5, 6}											1	1							
38	P = {1, 2} and Q = {4, 5}											2	2							
39	S = {a, b, c, d, e, f }											1	1							
40	F = {a, b, c, d, } and G = {a, d, e }											2	2							
		1	8	0	0	0	0	0	0	2	2	13	13	0	0	0	0	0	0	0

No	Clause Expressions	Participant Functions																		
		Act	Gl	Rec	Cl	Rg	Agn	Sns	Phe	Car	Att	Id	Ir	Sy	Rcv	Vb	Tg	Bhv	Bho	Ex
41	S = {natural numbers which are less than 15}											1	1							
42	A = {odd natural numbers which are less than 10}											1	1							
43	B = {even natural numbers between 1 and 11}											1	1							
44	C = {prime numbers which are less than 10}											1	1							
45	Build a Venn diagram for each of the following collections of sets with S as their universal set!		1																	
46	Build a Venn diagram for the following sets:		1																	
47	S = {all students in your class}											1	1							
48	A = {students in your class who wear glasses}											1	1							
49	B = {left-handed students in your class}											1	1							
50	S = {counting numbers}											1	1							
51	A = {odd counting numbers}											1	1							
52	B = {even counting numbers}											1	1							
53	C = {prime numbers}											1	1							
54	Build a Venn diagram for each of the following collections of sets with S as their universal set!		1																	
55	From the above Venn diagram, describe the sets specified below by listing their members!		1																	
56	The following diagram is a Venn diagram for the sets:									1	1									
57	S = {all students in grade VII-A}											1	1							
58	P = {students in class VII-A who like science}											1	1							
59	M = {students in class VII-A who like math}											1	1							
60	Determine the numbers of students!								1											
		0	4	0	0	0	0	0	1	1	1	14	14	0	0	0	0	0	0	0

No	Clause Expressions	Participant Functions																		
		Act	Gl	Rec	Cl	Rg	Agn	Sns	Phe	Car	Att	Id	Ir	Sy	Rcv	Vb	Tg	Bhv	Bho	Ex
61	Describe each of the following subsets of A = {1, 3, 5, 7, 9} by listing its members!		1																	
62	Tell whether each of the following sentences is *true* or *false*!															1				
63	{2, 4} ⊂ {2, 4, 6}									1	1									
64	{k, l} ⊂ {h, i, k, l, m}									1	1									
65	p ⊂ {p, q, r}									1	1									
66	{d, e, f} ⊂ {d, e, f}									1	1									
67	{$\emptyset$} ⊂ {0, 100}									1	1									
68	{ } ⊂ {0}									1	1									
69	Write the relationship between each pair of the following sets using the ⊂ notation!		1																	
70	A = {a, i, u, e, o}											1	1							
71	B = {2, 4, 6, 8, . . .}											1	1							
72	C = {100}											1	1							
73	D = {i, a, e}											1	1							
74	E = {100, 101}											1	1							
75	F = {i, e}											1	1							
76	For S = {1, 2, 3, 4, 5, 6}, describe the following subsets of S by extention!		1																	
77	Describe all possible subsets of P = {2, 3, 4, 5, 7, 11} specified below!		1																	
78	Write down all subsets of {a, b}!		1																	
79	Write down 6 subsets of {pencil, compass, book}!		1																	
80	Write down the subsets of M = {a, b, c, d} which have two members, and find their number!		2																	
		0	8	0	0	0	0	0	0	6	6	6	6	0	0	1	0	0	0	0

No	Clause Expressions	Participant Functions																		
		Act	Gl	Rec	Cl	Rg	Agn	Sns	Phe	Car	Att	Id	Ir	Sy	Rcv	Vb	Tg	Bhv	Bho	Ex
81	Write down the subsets of $M = \{a, b, c, d\}$ which have three members, and find their number!		2																	
82	Find the number of all possible subsets from each of the following sets!		1																	
83	$P = \{y \mid y \quad 8, y \in A\}$, A is a set of natural numbers!									1	1	1	1							
84	$Q = \{p \mid -2 \quad p \quad 5, p \in B\}$, B is a set of integers!									1	1	1	1							
85	Write down all subsets of $K = \{\text{factors of } 16\}$!		1																	
86	$P = \{a, b, c, d, e, f\}$											1	1							
87	$Q = \{b, c, d\}$											1	1							
88	$R = \{d, e, f, g\}$											1	1							
89	List each member of $P \cap Q$		1																	
90	$V = \{\text{vowels}\}$											1	1							
91	$F = \{u, c, o, k, m, a, i, n\}$											1	1							
92	Describe $V \cap F$ by listing its members!		1																	
93	What is the relationship between $V \cap F$ and V?											1	1							
94	Build the corresponding Venn diagram and shade in the area representing $V \cap F$!		1																	
95	$S = \{\text{all counting numbers}\}$											1	1							
96	$K = \{x \mid x \quad 20, x \text{ is an odd counting number}\}$									1	1	1	1							
97	$L = \{x \mid x \quad 20, x \text{ is an even counting number}\}$									1	1	1	1							
98	$M = \{x \mid x \quad 20, x \text{ is a prime number}\}$									1	1	1	1							
99	Describe each of the following intersections of sets by listing its members!		1																	
100	$A = \{\text{Indonesians who are at least 21 years old}\}$											1	1							
		0	8	0	0	0	0	0	0	5	5	13	13	0	0	0	0	0	0	0

No	Clause Expressions	Participant Functions																		
		Act	Gl	Rec	Cl	Rg	Agn	Sns	Phe	Car	Att	Id	Ir	Sy	Rcv	Vb	Tg	Bhv	Bho	Ex
101	$M = \{\text{members of Indonesian Legislative Assembly}\}$											1	1							
102	Build a Venn diagram and shade in the area representing $A \cap M$!		1																	
103	$A = \{\text{prime factors of } 330\}$											1	1							
104	$B = \{\text{common factors of 24 and 60}\}$											1	1							
105	$C = \{\text{odd counting numbers which are less than 11}\}$											1	1							
106	Describe each of the following intersections of sets by listing its members!		1																	
107	With the set of all natural numbers as the universe, show each of those intersections in a separate diagram,		1																	
108	and shade in the intersection are!																			
109	$S = \{\text{integers}\}$											1	1							
110	$P = \{x \mid -2 \quad x \quad 6\}$											1	1							
111	$Q = \{x \mid -1 \quad x \quad 8\}$											1	1							
112	$R = \{x \mid -3 \quad x \quad 9\}$											1	1							
113	By listing its members, describe $P \cap Q \cap R$!		1																	
114	Describe the union of each of the following pairs of sets and shade in the area representing the union in its corresponding Venn di		1																	
115	$A = \{1, 2, 3, 4, 5\}$											1	1							
116	$B = \{3, 5, 7, 9\}$											1	1							
117	$E = \{2, 4, 6, 8, 10\}$											1	1							
118	$F = \{4, 8, 2, 6, 10\}$											1	1							
119	$A = \{\text{natural numbers which are less than 7}\}$											1	1							
120	$B = \{\text{odd numbers which are less than 8 and evenly divisible by 3}\}$											1	1							
		0	5	0	0	0	0	0	0	0	0	14	14	0	0	0	0	0	0	0

No	Clause Expressions	Participant Functions																		
		Act	Gl	Rec	Cl	Rg	Agn	Sns	Phe	Car	Att	Id	Ir	Sy	Rcv	Vb	Tg	Bhv	Bho	Ex
121	C = {factors of 15}											1	1							
122	Describe each of the following unions of sets by listing its members!		1																	
123	M = {counting numbers which are multiples of 2 and less than 15}											1	1							
124	N = {counting numbers which are multiples of 4 and less than 12}											1	1							
125	Describe $M \cup N$ by listing its members!		1																	
126	Determine $n(M \cup N)$!								1											
127	Build the corresponding Venn diagram and shade in the area representing $M \cup N$!		1																	
128	With the set of all natural numbers as the universe, describe each of the following sets by listing its members!		1																	
129	$D = \{x \mid 1 \quad x \quad 8\}$											1	1							
130	$E = \{x \mid 3 \quad x \quad 10\}$											1	1							
131	$F = \{x \mid 2 \quad x \quad 8\}$											1	1							
132	Find the results of the following operations on sets!		1																	
133	$A = \{x \mid 0 \quad x \quad 7\}$											1	1							
134	$B = \{x \mid -3 \quad x \quad 5\}$											1	1							
135	$C = \{x \mid -1 \quad x \quad 8\}$											1	1							
136	With the set of all integers as the universe, find $A \cup B \cup C$!		1																	
137	Find $A \cap B \cap C$!		1																	
138	A = {a, b, c, d, e, f }											1	1							
139	B = {c, f, g, h, i, j }											1	1							
140	Describe the following differences of sets!		1																	
		0	8	0	0	0	0	0	1	0	0	11	11	0	0	0	0	0	0	0

No	Clause Expressions	Participant Functions																		
		Act	Gl	Rec	Cl	Rg	Agn	Sns	Phe	Car	Att	Id	Ir	Sy	Rcv	Vb	Tg	Bhv	Bho	Ex
141	Determine the relationship between the sets P and Q if P - Q = { }								1			1	1							
142	From the above Venn diagram, desribe A - B		1																	
143	S = {1, 2, 3, 4, 5, 6, 7}											1	1							
144	A = {1, 2, 3, 6}											1	1							
145	Describe A' by listing its members!		1																	
146	From the figure below, describe each of the following sets by listing its members!		1																	
147	Using the following diagram, shade in the area representing each of the following sets in a separate diagram!		1																	
148	Each area marked with a number from I to IV in the following diagram represents one set.		1																	
149	Match each of the following sets with one of the above areas!		1																	
150	In a group of children, there are 20 children who like milk																			1
151	15 children like tea							1	1											
152	12 children like both beverages							1	1											
153	and 7 children like neither milk nor tea							1	1											
154	Build a Venn diagram based on the above information!		1																	
155	How many children are there in that group!																			1
		0	7	0	0	0	0	3	4	0	0	3	3	0	0	0	0	0	0	2

Appendix VI: The Analysis of Participant Functions of Mathematics Texts in Chapter 7 o*Bilingual Mathematical Textbook 7B of Junior High School* **Published by Erlangga**

No	Clause Expressions	Participant Functions																		
		Act	Gl	Rec	Cl	Rg	Agn	Sns	Phe	Car	Att	Id	Ir	Sy	Rcv	Vb	Tg	Bhv	Bho	Ex
1	Do the following unit conversation!		1																	
2	Express the results of the following additions in degrees!		1																	
3	Find the results of the following additions and subtractions!		1																	
4	Look at the following figure!								1											
5	Based on the figure, name the following angles using three letters!		1																	
6	Using three letters, name all the angles which have the following lines as one of their rays!		1																	
7	Construct the following angles using a protractor!		1																	
8	$\angle ABC = 40^\circ$											1	1							
9	$\angle GHK = 115^\circ$											1	1							
10	$\angle STU = 67^\circ$											1	1							
11	$\angle AOB = 164^\circ$											1	1							
12	Use your protractor to measure each of the following angles.		2																	
13	Write your results as, for example$\angle XYZ = 70^\circ$		1																	
14	By using a compass and a ruler, duplicate each of the following angles!		1																	
15	Duplicate and bisect each of the following angles using a compass and a ruler!		1																	
16	In the above ΔABC, bisect $\angle A$, $\angle B$, and $\angle C$!		1																	
17	Draw a sketch for each of the following angles!		1																	
18	Take a look at a clock face.								1											
19	How many right angles does the second hand rotate through if it moves from 12 to 12?	2	1																	
20	A wheel of a bicycle completes 4 full turns.									1	1									
		2	14	0	0	0	0	0	2	1	1	4	4	0	0	0	0	0	0	0

No	Clause Expressions	Participant Functions																		
		Act	Gl	Rec	Cl	Rg	Agn	Sns	Phe	Car	Att	Id	Ir	Sy	Rcv	Vb	Tg	Bhv	Bho	Ex
21	Construct the following angles using a compass and a ruler!		1																	
22	Construct $\angle RST = 22{,}5^\circ$ on the following line!		1																	
23	Using a compass and a ruler, construct a 120̊ angle		1																	
24	Using a compass and a ruler, divide the 120̊ angle into 4 equal angles!		1																	
25	Label each of the following angles as an acute angle or an obtuse angle!		1																	
26	Label each of the following angles as an acute angle, a right angle, an obtuse angle, or a reflex angle!		1																	
27	Show acute angles as many as you can find in the above figure!		1																	
28	Show obtuse angles as many as you can find in the above figure!		1																	
29	If the measure of $\angle BOC = 80^\circ$, find the measure of $\angle AOC$!		1									1	1							
30	If $y = 130$, find x!		1									1	1							
31	If $x = 74$, find y!		1									1	1							
32	Find the supplements of 15̊		1																	
33	Find the values of a and b!		1																	
34	Find the measure of $\angle ABD$ and $\angle PQS$!		1																	
35	The measure of an angle is 5 times the measure of its supplement.									1	1									
36	Find the measure of that angle!		1																	
37	The ratio of the measure of an angle to the measure of its supplement is 2 : 3.											1	1							
38	If $x = 35$, then find the value of y!		1									1	1							
39	If $y = 62$, then find the value of x!		1									1	1							
40	If $x = 0$, then find the value of y!		1									1	1							
		0	18	0	0	0	0	0	0	1	1	7	7	0	0	0	0	0	0	0

No	Clause Expressions	Participant Functions																		
		Act	Gl	Rec	Cl	Rg	Agn	Sns	Phe	Car	Att	Id	Ir	Sy	Rcv	Vb	Tg	Bhv	Bho	Ex
41	Find the measure of the complement of each of the following angles!		1																	
42	If the measure of $\angle A$ is twice the measure of its complement, find the measure of $\angle A$!		1							1	1									
43	If the measure of the complement of $\angle B$ is 1½ times the measure of $\angle B$, find the measure of $\angle B$!		1							1	1									
44	Show two pairs of opposite angles!		1																	
45	Show the pairs of opposite angles as many as you can find!		1																	
46	Find the measure of $\angle BOC$		1																	
47	In the figure below, find the values of a, b, and c!		1																	
48	In the above figure, show the intersection point between each of the following pairs of lines!		1																	
49	Look at the above picture of a cuboid.								1											
50	Show four edged which are vertical lines!		1																	
51	Tell whether the following statements are *true* or *false*!															1				
52	It is impossible for two horizontal lines to be perpendicular to each other.									1	1									
53	If a vertical line and a horizontal line meet, then both lines will form four right angles.	2	1																	
54	It is impossible for two vertical lines to be perpendicular to each other.									1	1									
55	If two lines are perpendicular to each other, then one of them must be a vertical line while the other must be a horizontal line.									2	2									
56	If there is a horizontal line, any line which is perpendicular to it must be a vertical line.									1	1									1
57	Show all edges which are in a vertical direction!		1																	
58	In the above figure, find two pairs of parallel lines!		1																	
59	From the above figure, show the line which is parallel to each of the following lines!		1																	
60	From the above cuboid $ABCD.EFGH$, find the edges which are parallel to each of the following edges!		1																	
		2	14	0	0	0	0	0	1	7	7	0	0	0	0	1	0	0	0	1

No	Clause Expressions	Participant Functions																		
		Act	Gl	Rec	Cl	Rg	Agn	Sns	Phe	Car	Att	Id	Ir	Sy	Rcv	Vb	Tg	Bhv	Bho	Ex
61	Line p // line q. If line r intersects line p, then line r also intersects line q.											3	3							
62	If line k intersects line l, then line k intersects line m.											2	2							
63	If line a and line b pass through point P and both lines are parallel to line q, then line a and line b are coincident.	1	1							1	1	1	1							
64	In the above figure, line p // line q are intersected by a line r.											1	1							
65	Tell the numbers which label the corresponding angles!															1				
66	In the above figure, find three pairs of corresponding angles!		1																	
67	In the above figure, find four pairs of alternate interior angles!		1																	
68	In the above figure, $\angle SPQ = 70^\circ$											1	1							
69	Find the measure of each of the following angles!		1																	
70	The above figure shows a staircase with parallel posts.											1	1							
71	Find the values of p and q in the following figure!		1																	
72	In the above figure, AC // FE, and $\angle DBC = 115^\circ$											2	2							
73	Find the measure of $\angle ABE$!		1																	
		1	6	0	0	0	0	0	0	1	1	11	11	0	0	1	0	0	0	0

Appendix VII: The Analysis of Participant Functions of Mathematics Texts in Chapter 8 of *Bilingual Mathematical Textbook 7B of Junior High School* Published by Erlangga

No	Clause Expressions	Participant Functions																		
		Act	Gl	Rec	Cl	Rg	Agn	Sns	Phe	Car	Att	Id	Ir	Sy	Rcv	Vb	Tg	Bhv	Bho	Ex
1	Draw a rectangle $PQRS$ with its diagonals and then show the two pairs of parallel sides!		2																	
2	In the above figure, $DEFG$ is a rectangle.									1	1									
3	Find the value of a!		1																	
4	In a rectangle $KLMN$, the length of KL = 6 cm, MN = $3y$ cm, and the measure of $\angle LKN$ = $5n^\circ$.											3	3							
5	Find the value of y!		1																	
6	Draw a rectangle $ABCD$ whose diagonals intersect at point O.		1																	
7	If the length of AC = 10 cm, find the length of BD!		1									1	1							
8	The length of each diagonal in a rectangle is ($4x$ - 3) cm and ($2x$ + 7) cm											1	1							
9	Find the value of x!		1																	
10	From the above square $PQRS$, show three lines which have the same length as PQ!		1																	
11	In a square $ABCD$, the length of the diagonal AC = 15 cm and the length of the diagonal BD = ($2x$ + 7) cm.											2	2							
12	Draw a square $DEFG$ whose diagonals intersect at a point H.		1																	
13	If the length of DE = 12 cm, and the length of the diagonal DF = 17 cm, find the lengths of DG and GF!		1									2	2							
14	Nine squares whose sides have length 12 cm are arranged so as to form a bigger square.		1																	
15	Make a drawing of that square!		1																	
16	What is the length of each side of the new bigger square!											1	1							
17	A rectangle is 8 cm long and 5 cm wide. Find its perimeter!		1							1	1									
18	The perimeter of a rectangle = 60 cm and its length = 20 cm. Find its width!		1									2	2							
19	Find the perimeter of a square whose sides have length 15 cm!		1																	
20	The perimeter of a square = 80 cm.											1	1							
		0	15	0	0	0	0	0	0	2	2	13	13	0	0	0	0	0	0	0

No	Clause Expressions	Participant Functions																		
		Act	Gl	Rec	Cl	Rg	Agn	Sns	Phe	Car	Att	Id	Ir	Sy	Rcv	Vb	Tg	Bhv	Bho	Ex
21	Find the length of each of its sides!		1																	
22	The perimeter of a rectangle = 100 cm.											1	1							
23	The ratio of its length to its width is 3 : 2.											1	1							
24	Find its length and width!		1																	
25	The perimeter of a square is equal to the perimeter of a rectangle.											1	1							
26	If the perimeter of the square = 40 cm and the width of the rectangle = 5 cm, then find the length of the rectangle!		1									2	2							
27	Find the perimeter of the shaded area in each of the following figures!		1																	
28	Find the area of the rectangle whose length and width measure 6 cm and 4 cm!		1																	
29	The area of a rectangle = 150 cm² and its width = 10 cm. Find its length!		1									2	2							
30	Find the area of the square whose sides have the following length!		1																	
31	The perimeter of a square is 48 cm. Find its area!		1									1	1							
32	The area of a square is = 64 cm².											1	1							
33	Find the length of each of its sides!		1																	
34	$KLMN$ is a parallelogram whose diagonals intersect at a point T.									1	1									
35	Name two pairs of parallel lines!		1																	
36	Name four pairs of lines which are equal in length!		1																	
37	Name two pairs of interior angles which are equal in measure!		1																	
38	Duplicate the following parallelograms, and then find the length of each unknown side and the measure of each unknown angle!		2																	
39	Find the values of x and y in each of the following parallelogram!		1																	
40	PQ and RS are two straight lines which intersect at their midpoints O.									1	1									
		0	15	0	0	0	0	0	0	2	2	9	9	0	0	0	0	0	0	0

No	Clause Expressions	Participant Functions																		
		Act	Gl	Rec	Cl	Rg	Agn	Sns	Phe	Car	Att	Id	Ir	Sy	Rcv	Vb	Tg	Bhv	Bho	Ex
41	Is $PQRS$ a parallelogram?									1	1									
42	The ratio of the measure of an angle to that of an adjacent angle in a parallelogram is 2 : 3.											1	1							
43	Find the measure of each of the interior angles in that parallelogram!		1																	
44	Find the area of each of the following parallelogram!		1																	
45	The length of the base of a parallelogram = $4y$ cm and its altitude = $3y$ cm.											2	2							
46	If the area of that parallelogram is 192 cm², find the lengths of its base and altitude!		1									1	1							
47	Write down two formulas for the area of the above parallelogram $ABCD$!		1																	
48	Find the area of the parallelogram $ABCD$!		1																	
49	Find the length of CE using an equation formed from those formulas!		1																	
50	Draw a parallelogram $PQRS$ with the length of PQ = 6 cm and the magnitude of $\angle QPS = 60^\circ$		1																	
51	Draw the altitude ST and then measure its length to the nearest mm!		2																	
52	Find the area of that parallelogram!		1																	
53	Duplicate the following rhombi and write the measure of each interior angle in each figure!		2																	
54	In a rhombus $EFGH$, the length of side $EF = (5x - 3)$ cm and that of side $GH = (2x + 3)$ cm.											2	2							
55	Find the length of each side of that rhombus!		1																	
56	Tell whether each of the following statements is true or false for every rhombus!															1				
57	All sides are equal in length.									1	1									
58	The two diagonals are equal in length.									1	1									
59	The two diagonals bisect each other.	1	1																	
60	In the rhombus $ABCD$ above, find the value of x!		1																	
		1	15	0	0	0	0	0	0	3	3	6	6	0	0	1	0	0	0	0

No	Clause Expressions	Participant Functions																		
		Act	Gl	Rec	Cl	Rg	Agn	Sns	Phe	Car	Att	Id	Ir	Sy	Rcv	Vb	Tg	Bhv	Bho	Ex
61	In a rhombus $ABCD$, $AC : BD = 4 : 3$.											1	1							
62	If the rhombus area is 150 cm², find the length of the diagonals AC and BD!		1									1	1							
63	Find the area of the rhombus whose diagonals are 9 cm and 12 cm long!		1																	
64	Draw a kite ABCD and its diagonals, and then mark the lines and angles which have the same measure!		2																	
65	Duplicate the following kites and write the measure of each interior angle!		2																	
66	Tell whether each of the following statements is true or false for every kite!															1				
67	The diagonals are equal in length.									1	1									
68	The diagonals intersect at a right angle.											1	1							
69	Every kite has two pairs of sides with the same length.									1	1									
70	The opposite interior angles are equal in measure.									1	1									
71	Find the area of each of the following kites!		1																	
72	The area of kite is 60 cm²											1	1							
73	If the length of one of its diagonals is 8 cm, find the length of the other diagonal!		1									1	1							
74	Find the shaded figure in the above figure!		1																	
75	Duplicate the following trapeziums and then write the measure of each interior angle!		2																	
76	In an isosceles trapezium $ABCD$, the length of $AD = BC$, and the measure of $A = 60^\circ$											2	2							
77	Find the measure of each of $\angle B$!		1																	
78	Find the area of each of the following trapeziums!		1																	
79	The ratio of the lengths of parallel opposite sides of a trapezium is 4 : 3.											1	1							
80	If the altitude of the trapezium is 8 cm, and its area is 84 cm², then find the lengths of the parallel sides!		1									2	2							
		0	14	0	0	0	0	0	0	3	3	10	10	0	0	1	0	0	0	0

No	Clause Expressions	Participant Functions																		
		Act	Gl	Rec	Cl	Rg	Agn	Sns	Phe	Car	Att	Id	Ir	Sy	Rcv	Vb	Tg	Bhv	Bho	Ex
81	A rectangular garden measures 9 m x 6 m.									1	1									
82	If lamp posts are to be installed at the perimeter of that garden with a distance of 3 m between every two posts, then how many la		2																	
83	The following figure shows a square boxing ring with sides measuring 6 m each.											1	1							
84	Three strands of protecting rope are fastened around its perimeter.		1																	
85	Find the perimeter of that boxing ring!		1																	
86	How many meters of rope are required?		1																	
87	The above figure shows a badminton field.											1	1							
88	That field is to be concreted at a cost of Rp60,000/m².									1	1									
89	What is the total cost for concreting the whole field?											1	1							
90	The above figure shows a roof of a house which consists of a pair of trapeziums and a pair of triangles.											1	1							
91	If every m² of the roof requires 20 roof-tiles, then how many roof-tiles are required to cover the whole roof?	1	3																	
92	The above figure shows the interior of a room.											1	1							
93	The door measures 0.9 m x 2 m, and the window measures 1.5 m x 1.5 m.									2	2									
94	How many bricks are required to construct the room if every m² of the wall requires 70 bricks?	1	3																	
		2	11	0	0	0	0	0	0	4	4	5	5	0	0	0	0	0	0	0

Appendix VIII: The Analysis of Participant Functions of Mathematics Texts in Chapter 9 of *Bilingual Mathematical Textbook 7B of Junior High School* Published by Erlangga

No	Clause Expressions	Participant Functions																		
		Act	Gl	Rec	Cl	Rg	Agn	Sns	Phe	Car	Att	Id	Ir	Sy	Rcv	Vb	Tg	Bhv	Bho	Ex
1	Among the following figures, which figure is an acute triangle?									1	1									
2	Look at the following figure!								1											
3	Name two isosceles triangles which have PO as one of their sides!		1																	
4	The above figure is an isosceles triangle ΔPQR.									1	1									
5	The lengths of PR = 15 cm and QS = 8 cm.											2	2							
6	Name two triangles which form ΔPQR!		1																	
7	What are the lengths of PQ, SR, and QR?											1	1							
8	The following figures are isosceles triangles.									1	1									
9	Duplicate these figures and write down the unknown lengths of their sides and the unknown measures of their interior angles!		2																	
10	Each of the following figures consist of two congruent isosceles triangles.									1	1									
11	In the above figure, ΔABC is an equilateral triangle in which the length of AB = 6 cm.									1	1									
12	Find the lengths of AC, BC, and BD!		1																	
13	The above figure shows a tessellation with equilateral triangles in which the length AB = 1 cm.											1	1							
14	How many equilateral triangles whose sides have lengths of 1 cm can you find?	1	1																	
15	What is the total number of equilateral triangles?											1	1							
16	The above figure shows six congruent equilateral triangles which are laid side by side such that they form a regular hexagon.											1	1							
17	What is the measure of $\angle AOB$?											1	1							
18	Name 11 lines which have the same length as AB!		1																	
19	By using your compass and ruler, construct the perpendicular to the line XY through the point P!		1																	
20	Construct an altitude through the vertex A in ΔABC if $\angle A$ is an acute angle!		1							1	1									
		1	9	0	0	0	0	0	1	6	6	7	7	0	0	0	0	0	0	0

No	Clause Expressions	Participant Functions																		
		Act	Gl	Rec	Cl	Rg	Agn	Sns	Phe	Car	Att	Id	Ir	Sy	Rcv	Vb	Tg	Bhv	Bho	Ex
21	Construct the perpendicular to the line AB through the point Q!		1																	
22	Construct a rhombus $ABCD$ in which the length of the diagonal AC = 5 cm and the diagonal BD = 8 cm!		1																	
23	By using your protractor, measure each of the angles which you have constructed!		1																	
24	Construct ΔABC in which $\angle A = 90^\circ$, AB = 5 cm, and AC = 3 cm!		1																	
25	Find the measure of the third angle in a triangle if its two angles are given as follows!		2																	
26	The ratio of the measures of angles in a triangle is 2 : 3 : 4.											1	1							
27	Find the measure of each angle in that triangle!		1																	
28	Find the values of m and n in the following figure!		1																	
29	The measures of angles in a triangle are given by x°, $(40 + 3x)^\circ$, and $(30 + x)^\circ$.	1	1																	
30	Find the value of x!		1																	
31	Which of the following sets of three lines can be used to form a triangle?		2																	
32	In the above figure, $\angle BAC = 60^\circ$ and $\angle CBD = 140^\circ$.											2	2							
33	Find the measure of $\angle ACB$!		1																	
34	Find the perimeter of a triangle whose sides are 15 cm, 12 cm, and 18 cm!		1																	
35	Find the perimeter of an equilateral triangle whose one of its sides is 16 cm long!		1																	
36	In an isosceles triangle ABC, $AB = AC$, AB = 10 cm, and BC = 8 cm.											3	3							
37	Find the perimeter of the triangle!		1																	
38	Find the areas of the triangles with the following measures!		1																	
39	The area of a triangle is 120 cm² and its base is 30 cm.											2	2							
40	Find its altitude!		1																	
41	Find the length of the base of a triangle whose area is 90 cm² and altitude is 18 cm!		1																	
42	In the following ΔABC, the length of AB = 8 cm, AC = 6 cm, and BC = 10 cm.											3	3							
43	Find the area of ΔABC!		1																	
		1	20	0	0	0	0	0	0	0	0	11	11	0	0	0	0	0	0	0

Appendix IX: The Analysis of Participant Types of Mathematics Texts in Chapter 6 of *Bilingual Mathematical Textbook 7B of Junior High School* Published by Erlangga

No	Clause Expressions	Participant Types	
		H	NH
1	Which of the following groups and collections are considered as sets?		1
2	Explain your answer!		1
3	Give five instances of groups which serve as sets, and name four members of each group!		2
4	Express the following sets using braces!		1
5	M is a set of students in your class who are 13 years old.		2
6	T is a set of even counting numbers which are less than 14.		2
7	Tell whether each of the following sentences is *true* or *false*!		1
8	5 ∈ {1, 3, 5, 7}		2
9	6 ∈ {even numbers}		2
10	16 ∈ {2, 4, 6, 8, . . . , 20}		2
11	Achmad Yani ∈ {heroes of the revolution}	1	1
12	3 ∈ {333}		2
13	∈ {capital letters}		2
14	Semeru ∈ {volcanoes}		2
15	A = {natural numbers which are less than 6}.		2
16	B = {natural numbers which are multiples of 3, but less than 100}.		2
17	Complete the following sentences with the symbol ∈ or ∉ so that they become true sentences!		1
18	Use the symbol ∈ to match the available elements with the available sets so that they become true sentences!		2
19	Determine the number of members of each of the following sets!		1
20	M = {prime numbers which are less than 20}.		2
		1	33

No	Clause Expressions	Participant Types	
		H	NH
21	N = {letters which form the word "makanan"}.		2
22	Describe each of the following sets by listing all its members inside braces!		1
23	A = {counting numbers which are more than 3 and less than 10}		2
24	B = {odd numbers which are evenly divisible by 5 and less than 60}		2
25	C = {letters which occur only once in the word "matematika"}		2
26	$D = \{p \mid 2 \quad p \quad 9, p \in A\}$, where A is the set of all natural numbers.		2
27	$E = \{x \mid -2 \quad 2x \quad 10, x$ is an integer$\}$		4
28	P = {odd counting numbers which are less than 16 and evenly divisible by 3}		2
29	Describe the above set P by set-builder notation!		1
30	Describe the above set P by extention (listing all of its members)!		1
31	Describe each of the following sets by words and set-builder notation!		1
32	For S = {1, 2, 3, 4, . . . , 11}, describe the following sets by listing their members!		1
33	For M = {2, 4, 6, 8, 10}, build a set R whose members the members of M multiplied by one half!		1
34	Which of the following sets is an empty set?		2
35	Describe one possible universal set for each of the following sets!		1
36	Build a Venn diagram for the following sets!		1
37	S = {1, 2, 3, 4, 5, 6}		2
38	P = {1, 2} and Q = {4, 5}		4
39	$S = \{a, b, c, d, e, f\}$		2
40	$F = \{a, b, c, d, \}$ and $G = \{a, d, e\}$		4
		0	38

No	Clause Expressions	Participant Types	
		H	NH
41	S = {natural numbers which are less than 15}		2
42	A = {odd natural numbers which are less than 10}		2
43	B = {even natural numbers between 1 and 11}		2
44	C = {prime numbers which are less than 10}		2
45	Build a Venn diagram for each of the following collections of sets with S as their universal set!		1
46	Build a Venn diagram for the following sets:		1
47	S = {all students in your class}	1	1
48	A = {students in your class who wear glasses}	1	1
49	B = {left-handed students in your class}	1	1
50	S = {counting numbers}		2
51	A = {odd counting numbers}		2
52	B = {even counting numbers}		2
53	C = {prime numbers}		2
54	Build a Venn diagram for each of the following collections of sets with S as their universal set!		1
55	From the above Venn diagram, describe the sets specified below by listing their members!		1
56	The following diagram is a Venn diagram for the sets:		2
57	S = {all students in grade VII-A}	1	1
58	P = {students in class VII-A who like science}	1	1
59	M = {students in class VII-A who like math}	1	1
60	Determine the numbers of students!	1	
		7	28

No	Clause Expressions	Participant Types	
		H	NH
61	Describe each of the following subsets of A = {1, 3, 5, 7, 9} by listing its members!		1
62	Tell whether each of the following sentences is *true* or *false*!		1
63	{2, 4} $\subset$ {2, 4, 6}		2
64	{k, l} $\subset$ {h, i, k, l, m}		2
65	p $\subset$ {p, q, r}		2
66	{d, e, f} $\subset$ {d, e, f}		2
67	{$\emptyset$} $\subset$ {0, 100}		2
68	{ } $\subset$ {0}		2
69	Write the relationship between each pair of the following sets using the $\subset$ notation!		1
70	A = {a, i, u, e, o}		2
71	B = {2, 4, 6, 8, . . .}		2
72	C = {100}		2
73	D = {i, a, e}		2
74	E = {100, 101}		2
75	F = {i, e}		2
76	For S = {1, 2, 3, 4, 5, 6}, describe the following subsets of S by extention!		1
77	Describe all possible subsets of P = {2, 3, 4, 5, 7, 11} specified below!		1
78	Write down all subsets of {a, b}!		1
79	Write down 6 subsets of {pencil, compass, book}!		1
80	Write down the subsets of M = {a, b, c, d} which have two members, and find their number!		2
		0	33

No	Clause Expressions	Participant Types	
		H	NH
81	Write down the subsets of $M = \{a, b, c, d\}$ which have three members, and find their number!		2
82	Find the number of all possible subsets from each of the following sets!		1
83	$P = \{y \mid y \quad 8, y \in A\}$, A is a set of natural numbers!		4
84	$Q = \{p \mid -2 \quad p \quad 5, p \in B\}$, B is a set of integers!		4
85	Write down all subsets of K = {factors of 16}!		1
86	$P = \{a, b, c, d, e, f\}$		2
87	$Q = \{b, c, d\}$		2
88	$R = \{d, e, f, g\}$		2
89	List each member of P ⋂ Q		1
90	V = {vowels}		2
91	$F = \{u, c, o, k, m, a, i, n\}$		2
92	Describe $V \cap F$ by listing its members!		1
93	What is the relationship between $V \cap F$ and V?		2
94	Build the corresponding Venn diagram and shade in the area representing $V \cap F$!		1
95	S = {all counting numbers}		2
96	$K = \{x \mid x \quad 20, x$ is an odd counting number}		4
97	$L = \{x \mid x \quad 20, x$ is an even counting number}		4
98	$M = \{x \mid x \quad 20, x$ is a prime number}		4
99	Describe each of the following intersections of sets by listing its members!		1
100	A = {Indonesians who are at least 21 years old}	1	1
		2	43

No	Clause Expressions	Participant Types	
		H	NH
101	M = {members of Indonesian Legislative Assembly}	1	1
102	Build a Venn diagram and shade in the area representing $A \cap M$!		1
103	A = {prime factors of 330}		2
104	B = {common factors of 24 and 60}		2
105	C = {odd counting numbers which are less than 11}		2
106	Describe each of the following intersections of sets by listing its members!		1
107	With the set of all natural numbers as the universe, show each of those intersections in a separate diagram,		1
108	and shade in the intersection are!		
109	S = {integers}		2
110	$P = \{x \mid -2 \quad x \quad 6\}$		2
111	$Q = \{x \mid -1 \quad x \quad 8\}$		2
112	$R = \{x \mid -3 \quad x \quad 9\}$		2
113	By listing its members, describe $P \cap Q \cap R$!		1
114	Describe the union of each of the following pairs of sets and shade in the area representing the union in its corresponding Venn diagram!		1
115	$A = \{1, 2, 3, 4, 5\}$		2
116	$B = \{3, 5, 7, 9\}$		2
117	$E = \{2, 4, 6, 8, 10\}$		2
118	$F = \{4, 8, 2, 6, 10\}$		2
119	A = {natural numbers which are less than 7}		2
120	B = {odd numbers which are less than 8 and evenly divisible by 3}		2
		1	32

No	Clause Expressions	Participant Types	
		H	NH
121	C = {factors of 15}		2
122	Describe each of the following unions of sets by listing its members!		1
123	M = {counting numbers which are multiples of 2 and less than 15}		2
124	N = {counting numbers which are multiples of 4 and less than 12}		2
125	Describe $M \cup N$ by listing its members!		1
126	Determine $n(M \cup N)$!		1
127	Build the corresponding Venn diagram and shade in the area representing $M \cup N$!		1
128	With the set of all natural numbers as the universe, describe each of the following sets by listing its members!		1
129	$D = \{x \mid 1 \quad x \quad 8\}$		2
130	$E = \{x \mid 3 \quad x \quad 10\}$		2
131	$F = \{x \mid 2 \quad x \quad 8\}$		2
132	Find the results of the following operations on sets!		1
133	$A = \{x \mid 0 \quad x \quad 7\}$		2
134	$B = \{x \mid -3 \quad x \quad 5\}$		2
135	$C = \{x \mid -1 \quad x \quad 8\}$		2
136	With the set of all integers as the universe, find $A \cup B \cup C$!		1
137	Find $A \cap B \cap C$!		1
138	$A = \{a, b, c, d, e, f\}$		2
139	$B = \{c, f, g, h, i, j\}$		2
140	Describe the following differences of sets!		1
		0	31

No	Clause Expressions	Participant Types	
		H	NH
141	Determine the relationship between the sets P and Q if P - Q = { }		3
142	From the above Venn diagram, desribe A - B		1
143	S = {1, 2, 3, 4, 5, 6, 7}		2
144	A = {1, 2, 3, 6}		2
145	Describe A' by listing its members!		1
146	From the figure below, describe each of the following sets by listing its members!		1
147	Using the following diagram, shade in the area representing each of the following sets in a separate diagram!		1
148	Each area marked with a number from I to IV in the following diagram represents one set.		1
149	Match each of the following sets with one of the above areas!		1
150	In a group of children, there are 20 children who like milk	1	
151	15 children like tea	1	1
152	12 children like both beverages	1	1
153	and 7 children like neither milk nor tea	1	1
154	Build a Venn diagram based on the above information!		1
155	How many children are there in that group!	1	
		5	17

Appendix X: The Analysis of Participant Types of Mathematics Texts in Chapter 7 of *Bilingual Mathematical Textbook 7B of Junior High School* Published by Erlangga

No	Clause Expressions	Participant Types	
		H	NH
1	Do the following unit conversation!		1
2	Express the results of the following additions in degrees!		1
3	Find the results of the following additions and subtractions!		1
4	Look at the following figure!		1
5	Based on the figure, name the following angles using three letters!		1
6	Using three letters, name all the angles which have the following lines as one of their rays!		1
7	Construct the following angles using a protractor!		1
8	$\angle ABC = 40^\circ$		2
9	$\angle GHK = 115^\circ$		2
10	$\angle STU = 67^\circ$		2
11	$\angle AOB = 164^\circ$		2
12	Use your protractor to measure each of the following angles.		2
13	Write your results as, for example $\angle XYZ = 70^\circ$		1
14	By using a compass and a ruler, duplicate each of the following angles!		1
15	Duplicate and bisect each of the following angles using a compass and a ruler!		1
16	In the above ΔABC, bisect $\angle A$, $\angle B$, and $\angle C$!		1
17	Draw a sketch for each of the following angles!		1
18	Take a look at a clock face.		1
19	How many right angles does the second hand rotate through if it moves from 12 to 12?		3
20	A wheel of a bicycle completes 4 full turns.		2
		0	28

No	Clause Expressions	Participant Types	
		H	NH
21	Construct the following angles using a compass and a ruler!		1
22	Construct $\angle RST = 22{,}5^\circ$ on the following line!		1
23	Using a compass and a ruler, construct a 120° angle		1
24	Using a compass and a ruler, divide the 120° angle into 4 equal angles!		1
25	Label each of the following angles as an acute angle or an obtuse angle!		1
26	Label each of the following angles as an acute angle, a right angle, an obtuse angle, or a reflex angle!		1
27	Show acute angles as many as you can find in the above figure!		1
28	Show obtuse angles as many as you can find in the above figure!		1
29	If the measure of $\angle BOC = 80^\circ$, find the measure of $\angle AOC$!		3
30	If $y = 130$, find x!		3
31	If $x = 74$, find y!		3
32	Find the supplements of 15°		1
33	Find the values of a and b!		1
34	Find the measure of $\angle ABD$ and $\angle PQS$!		1
35	The measure of an angle is 5 times the measure of its supplement.		2
36	Find the measure of that angle!		1
37	The ratio of the measure of an angle to the measure of its supplement is 2 : 3.		2
38	If $x = 35$, then find the value of y!		3
39	If $y = 62$, then find the value of x!		3
40	If $x = 0$, then find the value of y!		3
		0	34

No	Clause Expressions	Participant Types	
		H	NH
41	Find the measure of the complement of each of the following angles!		1
42	If the measure of $\angle A$ is twice the measure of its complement, find the measure of $\angle A$!		3
43	If the measure of the complement of $\angle B$ is 1½ times the measure of $\angle B$, find the measure of $\angle B$!		3
44	Show two pairs of opposite angles!		1
45	Show the pairs of opposite angles as many as you can find!		1
46	Find the measure of $\angle BOC$		1
47	In the figure below, find the values of a, b, and c!		1
48	In the above figure, show the intersection point between each of the following pairs of lines!		1
49	Look at the above picture of a cuboid.		1
50	Show four edged which are vertical lines!		1
51	Tell whether the following statements are *true* or *false*!		1
52	It is impossible for two horizontal lines to be perpendicular to each other.		2
53	If a vertical line and a horizontal line meet, then both lines will form four right angles.		3
54	It is impossible for two vertical lines to be perpendicular to each other.		2
55	If two lines are perpendicular to each other, then one of them must be a vertical line while the other must be a horizontal line.		4
56	If there is a horizontal line, any line which is perpendicular to it must be a vertical line.		3
57	Show all edges which are in a vertical direction!		1
58	In the above figure, find two pairs of parallel lines!		1
59	From the above figure, show the line which is parallel to each of the following lines!		1
60	From the above cuboid $ABCD.EFGH$, find the edges which are parallel to each of the following edges!		1
		0	33

No	Clause Expressions	Participant Types	
		H	NH
61	Line p // line q. If line r intersects line p, then line r also intersects line q.		6
62	If line k intersects line l, then line k intersects line m.		4
63	If line a and line b pass through point P and both lines are parallel to line g, then line a and line b are coincident.		6
64	In the above figure, line p // line q are intersected by a liner r.		2
65	Tell the numbers which label the corresponding angles!		1
66	In the above figure, find three pairs of corresponding angles!		1
67	In the above figure, find four pairs of alternate interior angles!		1
68	In the above figure, $\angle SPQ = 70^\circ$		2
69	Find the measure of each of the following angles!		1
70	The above figure shows a staircase with parallel posts.		2
71	Find the values of p and q in the following figure!		1
72	In the above figure, AC // FE, and $\angle DBC = 115^\circ$		4
73	Find the measure of $\angle ABE$!		1
		0	32

Appendix XI: The Analysis of Participant Types of Mathematics Texts in Chapter 8 of *Bilingual Mathematical Textbook 7B of Junior High School* Published by Erlangga

No	Clause Expressions	Participant Types	
		H	NH
1	Draw a rectangle $PQRS$ with its diagonals and then show the two pairs of parallel sides!		2
2	In the above figure, $DEFG$ is a rectangle.		2
3	Find the value of a!		1
4	In a rectangle $KLMN$, the length of KL = 6 cm, MN = $3y$ cm, and the measure of $\angle LKN = 5n^\circ$.		6
5	Find the value of y!		1
6	Draw a rectangle $ABCD$ whose diagonals intersect at point O.		1
7	If the length of AC = 10 cm, find the length of BD!		3
8	The length of each diagonal in a rectangle is ($4x$ - 3) cm and ($2x$ + 7) cm		2
9	Find the value of x!		1
10	From the above square $PQRS$, show three lines which have the same length as PQ!		1
11	In a square $ABCD$, the length of the diagonal AC = 15 cm and the length of the diagonal BD = ($2x$ + 7) cm.		4
12	Draw a square $DEFG$ whose diagonals intersect at a point H.		1
13	If the length of DE = 12 cm, and the length of the diagonal DF = 17 cm, find the lengths of DG and GF!		5
14	Nine squares whose sides have length 12 cm are arranged so as to form a bigger square.		1
15	Make a drawing of that square!		1
16	What is the length of each side of the new bigger square!		2
17	A rectangle is 8 cm long and 5 cm wide. Find its perimeter!		3
18	The perimeter of a rectangle = 60 cm and its length = 20 cm. Find its width!		5
19	Find the perimeter of a square whose sides have length 15 cm!		1
20	The perimeter of a square = 80 cm.		2
		0	45

No	Clause Expressions	Participant Types	
		H	NH
21	Find the length of each of its sides!		1
22	The perimeter of a rectangle = 100 cm.		2
23	The ratio of its length to its width is 3 : 2.		2
24	Find its length and width!		1
25	The perimeter of a square is equal to the perimeter of a rectangle.		2
26	If the perimeter of the square = 40 cm and the width of the rectangle = 5 cm, then find the length of the rectangle!		5
27	Find the perimeter of the shaded area in each of the following figures!		1
28	Find the area of the rectangle whose length and width measure 6 cm and 4 cm!		1
29	The area of a rectangle = 150 cm² and its width = 10 cm. Find its length!		5
30	Find the area of the square whose sides have the following length!		1
31	The perimeter of a square is 48 cm. Find its area!		1
32	The area of a square is = 64 cm².		2
33	Find the length of each of its sides!		1
34	$KLMN$ is a parallelogram whose diagonals intersect at a point T.		2
35	Name two pairs of parallel lines!		1
36	Name four pairs of lines which are equal in length!		1
37	Name two pairs of interior angles which are equal in measure!		1
38	Duplicate the following parallelograms, and then find the length of each unknown side and the measure of each unknown angle!		2
39	Find the values of x and y in each of the following parallelogram!		1
40	PQ and RS are two straight lines which intersect at their midpoints O.		2
		0	35

No	Clause Expressions	Participant Types	
		H	NH
41	Is $PQRS$ a parallelogram?		2
42	The ratio of the measure of an angle to that of an adjacent angle in a parallelogram is 2 : 3.		2
43	Find the measure of each of the interior angles in that parallelogram!		1
44	Find the area of each of the following parallelogram!		1
45	The length of the base of a parallelogram = $4y$ cm and its altitude = $3y$ cm.		4
46	If the area of that parallelogram is 192 cm², find the lengths of its base and altitude!		3
47	Write down two formulas for the area of the above parallelogram $ABCD$!		1
48	Find the area of the parallelogram $ABCD$!		1
49	Find the length of CE using an equation formed from those formulas!		1
50	Draw a parallelogram $PQRS$ with the length of PQ = 6 cm and the magnitude of $\angle QPS = 60^\circ$		1
51	Draw the altitude ST and then measure its length to the nearest mm!		2
52	Find the area of that parallelogram!		1
53	Duplicate the following rhombi and write the measure of each interior angle in each figure!		2
54	In a rhombus $EFGH$, the length of side $EF = (5x - 3)$ cm and that of side $GH = (2x + 3)$ cm.		4
55	Find the length of each side of that rhombus!		1
56	Tell whether each of the following statements is true or false for every rhombus!		1
57	All sides are equal in length.		2
58	The two diagonals are equal in length.		2
59	The two diagonals bisect each other.		2
60	In the rhombus $ABCD$ above, find the value of x!		1
		0	35

No	Clause Expressions	Participant Types	
		H	NH
61	In a rhombus $ABCD$, $AC : BD = 4 : 3$.		2
62	If the rhombus area is 150 cm², find the length of the diagonals AC and BD!		3
63	Find the area of the rhombus whose diagonals are 9 cm and 12 cm long!		1
64	Draw a kite ABCD and its diagonals, and then mark the lines and angles which have the same measure!		2
65	Duplicate the following kites and write the measure of each interior angle!		2
66	Tell whether each of the following statements is true or false for every kite!		1
67	The diagonals are equal in length.		2
68	The diagonals intersect at a right angle.		2
69	Every kite has two pairs of sides with the same length.		2
70	The opposite interior angles are equal in measure.		2
71	Find the area of each of the following kites!		1
72	The area of kite is 60 cm²		2
73	If the length of one of its diagonals is 8 cm, find the length of the other diagonal!		3
74	Find the shaded figure in the above figure!		1
75	Duplicate the following trapeziums and then write the measure of each interior angle!		2
76	In an isosceles trapezium $ABCD$, the length of $AD = BC$, and the measure of $A = 60^\circ$		4
77	Find the measure of each of $\angle B$!		1
78	Find the area of each of the following trapeziums!		1
79	The ratio of the lengths of parallel opposite sides of a trapezium is 4 : 3.		2
80	If the altitude of the trapezium is 8 cm, and its area is 84 cm², then find the lengths of the parallel sides!		5
		0	41

No	Clause Expressions	Participant Types	
		H	NH
81	A rectangular garden measures 9 m x 6 m.		2
82	If lamp posts are to be installed at the perimeter of that garden with a distance of 3 m between every two posts, then how many lamp posts are required?		2
83	The following figure shows a square boxing ring with sides measuring 6 m each.		2
84	Three strands of protecting rope are fastened around its perimeter.		1
85	Find the perimeter of that boxing ring!		1
86	How many meters of rope are required?		1
87	The above figure shows a badminton field.		2
88	That field is to be concreted at a cost of Rp60,000/m^2.		2
89	What is the total cost for concreting the whole field?		2
90	The above figure shows a roof of a house which consists of a pair of trapeziums and a pair of triangles.		2
91	If every m^2 of the roof requires 20 roof-tiles, then how many roof-tiles are required to cover the whole roof?		4
92	The above figure shows the interior of a room.		2
93	The door measures 0.9 m x 2 m, and the window measures 1.5 m x 1.5 m.		4
94	How many bricks are required to construct the room if every m^2 of the wall requires 70 bricks?		4
		0	31

Appendix XII: The Analysis of Participant Types of Mathematics Texts in Chapter 9 of *Bilingual Mathematical Textbook 7B of Junior High School* Published by Erlangga

No	Clause Expressions	Participant Types	
		H	NH
1	Among the following figures, which figure is an acute triangle?		2
2	Look at the following figure!		1
3	Name two isosceles triangles which have PO as one of their sides!		1
4	The above figure is an isosceles triangle ΔPQR.		2
5	The lengths of PR = 15 cm and QS = 8 cm.		4
6	Name two triangles which form ΔPQR!		1
7	What are the lengths of PQ, SR, and QR?		2
8	The following figures are isosceles triangles.		2
9	Duplicate these figures and write down the unknown lengths of their sides and the unknown measures of their interior angles!		2
10	Each of the following figures consist of two congruent isosceles triangles.		2
11	In the above figure, ΔABC is an equilateral triangle in which the length of AB = 6 cm.		2
12	Find the lengths of AC, BC, and BD!		1
13	The above figure shows a tessellation with equilateral triangles in which the length AB = 1 cm.		2
14	How many equilateral triangles whose sides have lengths of 1 cm can you find?	1	1
15	What is the total number of equilateral triangles?		2
16	The above figure shows six congruent equilateral triangles which are laid side by side such that they form a regular hexagon.		2
17	What is the measure of $\angle AOB$?		2
18	Name 11 lines which have the same length as AB!		1
19	By using your compass and ruler, construct the perpendicular to the line XY through the point P!		1
20	Construct an altitude through the vertex A in ΔABC if $\angle A$ is an acute angle!		3
		1	36

No	Clause Expressions	Participant Types	
		H	NH
21	Construct the perpendicular to the line AB through the point Q!		1
22	Construct a rhombus $ABCD$ in which the length of the diagonal AC = 5 cm and the diagonal BD = 8 cm!		1
23	By using your protractor, measure each of the angles which you have constructed!		1
24	Construct ΔABC in which $\angle A = 90^\circ$, AB = 5 cm, and AC = 3 cm!		1
25	Find the measure of the third angle in a triangle if its two angles are given as follows!		2
26	The ratio of the measures of angles in a triangle is 2 : 3 : 4.		2
27	Find the measure of each angle in that triangle!		1
28	Find the values of m and n in the following figure!		1
29	The measures of angles in a triangle are given by x°, $(40 + 3x)^\circ$, and $(30 + x)^\circ$.		2
30	Find the value of x!		1
31	Which of the following sets of three lines can be used to form a triangle?		2
32	In the above figure, $\angle BAC = 60^\circ$ and $\angle CBD = 140^\circ$.		4
33	Find the measure of $\angle ACB$!		1
34	Find the perimeter of a triangle whose sides are 15 cm, 12 cm, and 18 cm!		1
35	Find the perimeter of an equilateral triangle whose one of its sides is 16 cm long!		1
36	In an isosceles triangle ABC, $AB = AC$, AB = 10 cm, and BC = 8 cm.		6
37	Find the perimeter of the triangle!		1
38	Find the areas of the triangles with the following measures!		1
39	The area of a triangle is 120 cm² and its base is 30 cm.		4
40	Find its altitude!		1
41	Find the length of the base of a triangle whose area is 90 cm² and altitude is 18 cm!		1
42	In the following ΔABC, the length of AB = 8 cm, AC = 6 cm, and BC = 10 cm.		6
43	Find the area of ΔABC!		1
		0	43

Appendix XIII: The Analysis of Circumstantial Elements of Mathematics Texts in Chapter 6 o*Bilingual Mathematical Textbook 7B of Junior High School* Published by Erlangga

No	Clause Expressions	Circumstantial Elements												
		Extent	Location		Manner			Cause			Accompaniment			
		Di	Ti	Pl	Mns	Qu	Co	Rsn	Pr	Bhf	Cmt	Add	Mtr	Rl
1	Which of the following groups and collections are considered as sets?													1
2	Explain your answer!													
3	Give five instances of groups which serve as sets, and name four members of each group!													
4	Express the following sets using braces!				1									
5	M is a set of students in your class who are 13 years old.													
6	T is a set of even counting numbers which are less than 14.													
7	Tell whether each of the following sentences is *true* or *false*!													
8	5 ∈ {1, 3, 5, 7}													
9	6 ∈ {even numbers}													
10	16 ∈ {2, 4, 6, 8, . . . , 20}													
11	Achmad Yani ∈ {heroes of the revolution}													
12	3 ∈ {333}													
13	∈ {capital letters}													
14	Semeru ∈ {volcanoes}													
15	A = {natural numbers which are less than 6}.													
16	B = {natural numbers which are multiples of 3, but less than 100}.													
17	Complete the following sentences with the symbol ∈ or ∉ so that they become true sentences!				1									
18	Use the symbol ∈ to match the available elements with the available sets so that they become true sentences!				1									
19	Determine the number of members of each of the following sets!													
20	M = {prime numbers which are less than 20}.													
		0	0	0	3	0	0	0	0	0	0	0	0	1

No	Clause Expressions	Circumstantial Elements												
		Extent	Location		Manner			Cause			Accompaniment			
		Di	Ti	Pl	Mns	Qu	Co	Rsn	Pr	Bhf	Cmt	Add	Mtr	Rl
21	N = {letters which form the word "makanan"}.													
22	Describe each of the following sets by listing all its members inside braces!				1									
23	A = {counting numbers which are more than 3 and less than 10}													
24	B = {odd numbers which are evenly divisible by 5 and less than 60}													
25	C = {letters which occur only once in the word "matematika"}													
26	D = {p I 2 p 9, p ∈ A }, where A is the set of all natural numbers.													
27	E = {x I -2 2x 10, x is an integer}													
28	P = {odd counting numbers which are less than 16 and evenly divisible by 3}													
29	Describe the above set P by set-builder notation!				1									
30	Describe the above set P by extention (listing all of its members)!				1									
31	Describe each of the following sets by words and set-builder notation!				1									
32	For S = {1, 2, 3, 4, . . . , 11}, describe the following sets by listing their members!				1									
33	For M = {2, 4, 6, 8, 10}, build a set R whose members the members of M multiplied by one half!													
34	Which of the following sets is an empty set?													
35	Describe one possible universal set for each of the following sets!								1					
36	Build a Venn diagram for the following sets!								1					
37	S = {1, 2, 3, 4, 5, 6}													
38	P = {1, 2} and Q = {4, 5}													
39	S = {a, b, c, d, e, f }													
40	F = {a, b, c, d, } and G = {a, d, e }													
		0	0	0	5	0	0	0	2	0	0	0	0	0

No	Clause Expressions	Circumstantial Elements												
		Extent	Location		Manner			Cause			Accompaniment			
		Di	Ti	Pl	Mns	Qu	Co	Rsn	Pr	Bhf	Cmt	Add	Mtr	Rl
41	S = {natural numbers which are less than 15}													
42	A = {odd natural numbers which are less than 10}													
43	B = {even natural numbers between 1 and 11}													
44	C = {prime numbers which are less than 10}													
45	Build a Venn diagram for each of the following collections of sets with S as their universal set!								1					
46	Build a Venn diagram for the following sets:								1					
47	S = {all students in your class}													
48	A = {students in your class who wear glasses}													
49	B = {left-handed students in your class}													
50	S = {counting numbers}													
51	A = {odd counting numbers}													
52	B = {even counting numbers}													
53	C = {prime numbers}													
54	Build a Venn diagram for each of the following collections of sets with S as their universal set!								1					
55	From the above Venn diagram, describe the sets specified below by listing their members!			1	1									
56	The following diagram is a Venn diagram for the sets:								1					
57	S = {all students in grade VII-A}													
58	P = {students in class VII-A who like science}													
59	M = {students in class VII-A who like math}													
60	Determine the numbers of students!													
		0	0	1	1	0	0	0	4	0	0	0	0	0

No	Clause Expressions	Circumstantial Elements												
		Extent	Location		Manner			Cause			Accompaniment			
		Di	Ti	Pl	Mns	Qu	Co	Rsn	Pr	Bhf	Cmt	Add	Mtr	Rl
61	Describe each of the following subsets of A = {1, 3, 5, 7, 9} by listing its members!				1									
62	Tell whether each of the following sentences is *true* or *false*!													
63	{2, 4} ⊂ {2, 4, 6}													
64	{k, l} ⊂ {h, i, k, l, m}													
65	p ⊂ {p, q, r}													
66	{d, e, f} ⊂ {d, e, f}													
67	{$\emptyset$} ⊂ {0, 100}													
68	{ } ⊂ {0}													
69	Write the relationship between each pair of the following sets using the ⊂ notation!				1									
70	A = {a, i, u, e, o}													
71	B = {2, 4, 6, 8, . . .}													
72	C = {100}													
73	D = {i, a, e}													
74	E = {100, 101}													
75	F = {i, e}													
76	For S = {1, 2, 3, 4, 5, 6}, describe the following subsets of S by extention!				1									
77	Describe all possible subsets of P = {2, 3, 4, 5, 7, 11} specified below!													
78	Write down all subsets of {a, b}!													
79	Write down 6 subsets of {pencil, compass, book}!													
80	Write down the subsets of M = {a, b, c, d} which have two members, and find their number!													
		0	0	0	3	0	0	0	0	0	0	0	0	0

No	Clause Expressions	Circumstantial Elements												
		Extent	Location		Manner			Cause			Accompaniment		Mtr	Rl
		Di	Ti	Pl	Mns	Qu	Co	Rsn	Pr	Bhf	Cmt	Add		
81	Write down the subsets of $M = \{a, b, c, d\}$ which have three members, and find their number!													
82	Find the number of all possible subsets from each of the following sets!			1										
83	$P = \{y \mid y \quad 8, y \in A\}$, A is a set of natural numbers!													
84	$Q = \{p \mid -2 \quad p \quad 5, p \in B\}$, B is a set of integers!													
85	Write down all subsets of K = {factors of 16}!													
86	$P = \{a, b, c, d, e, f\}$													
87	$Q = \{b, c, d\}$													
88	$R = \{d, e, f, g\}$													
89	List each member of P ∩ Q													
90	V = {vowels}													
91	$F = \{u, c, o, k, m, a, i, n\}$													
92	Describe $V \cap F$ by listing its members!				1									
93	What is the relationship between $V \cap F$ and V?													
94	Build the corresponding Venn diagram and shade in the area representing $V \cap F$!			1										
95	S = {all counting numbers}													
96	$K = \{x \mid x \quad 20, x$ is an odd counting number}													
97	$L = \{x \mid x \quad 20, x$ is an even counting number}													
98	$M = \{x \mid x \quad 20, x$ is a prime number}													
99	Describe each of the following intersections of sets by listing its members!				1									
100	A = {Indonesians who are at least 21 years old}													
		0	0	2	2	0	0	0	0	0	0	0	0	0

No	Clause Expressions	Circumstantial Elements												
		Extent	Location		Manner			Cause			Accompaniment		Mtr	Rl
		Di	Ti	Pl	Mns	Qu	Co	Rsn	Pr	Bhf	Cmt	Add		
101	M = {members of Indonesian Legislative Assembly}													
102	Build a Venn diagram and shade in the area representing $A \cap M$!			1										
103	A = {prime factors of 330}													
104	B = {common factors of 24 and 60}													
105	C = {odd counting numbers which are less than 11}													
106	Describe each of the following intersections of sets by listing its members!				1									
107	With the set of all natural numbers as the universe, show each of those intersections in a separate diagram,			1	1									
108	and shade in the intersection are!			1										
109	S = {integers}													
110	$P = \{x \mid -2 \quad x \quad 6\}$													
111	$Q = \{x \mid -1 \quad x \quad 8\}$													
112	$R = \{x \mid -3 \quad x \quad 9\}$													
113	By listing its members, describe $P \cap Q \cap R$!				1									
114	Describe the union of each of the following pairs of sets and shade in the area representing the union in its corresponding Venn diagr			1										
115	A = {1, 2, 3, 4, 5}													
116	B = {3, 5, 7, 9}													
117	E = {2, 4, 6, 8, 10}													
118	F = {4, 8, 2, 6, 10}													
119	A = {natural numbers which are less than 7}													
120	B = {odd numbers which are less than 8 and evenly divisible by 3}													
		0	0	4	3	0	0	0	0	0	0	0	0	1

No	Clause Expressions	Circumstantial Elements												
		Extent	Location		Manner			Cause			Accompaniment			
		Di	Ti	Pl	Mns	Qu	Co	Rsn	Pr	Bhf	Cmt	Add	Mtr	Rl
121	C = {factors of 15}													
122	Describe each of the following unions of sets by listing its members!				1									
123	M = {counting numbers which are multiples of 2 and less than 15}													
124	N = {counting numbers which are multiples of 4 and less than 12}													
125	Describe $M \cup N$ by listing its members!				1									
126	Determine $n(M \cup N)$!													
127	Build the corresponding Venn diagram and shade in the area representing $M \cup N$!			1										
128	With the set of all natural numbers as the universe, describe each of the following sets by listing its members!				2									
129	$D = \{x \mid 1 \quad x \quad 8\}$													
130	$E = \{x \mid 3 \quad x \quad 10\}$													
131	$F = \{x \mid 2 \quad x \quad 8\}$													
132	Find the results of the following operations on sets!			1										
133	$A = \{x \mid 0 \quad x \quad 7\}$													
134	$B = \{x \mid -3 \quad x \quad 5\}$													
135	$C = \{x \mid -1 \quad x \quad 8\}$													
136	With the set of all integers as the universe, find $A \cup B \cup C$!				1									
137	Find $A \cap B \cap C$!													
138	$A = \{a, b, c, d, e, f\}$													
139	$B = \{c, f, g, h, i, j\}$													
140	Describe the following differences of sets!													
		0	0	2	5	0	0	0	0	0	0	0	0	0

No	Clause Expressions	Circumstantial Elements												
		Extent	Location		Manner			Cause			Accompaniment			
		Di	Ti	Pl	Mns	Qu	Co	Rsn	Pr	Bhf	Cmt	Add	Mtr	Rl
141	Determine the relationship between the sets P and Q if P - Q = { }													
142	From the above Venn diagram, desribe A - B			1										
143	S = {1, 2, 3, 4, 5, 6, 7}													
144	A = {1, 2, 3, 6}													
145	Describe A' by listing its members!				1									
146	From the figure below, describe each of the following sets by listing its members!			1	1									
147	Using the following diagram, shade in the area representing each of the following sets in a separate diagram!			2	1									
148	Each area marked with a number from I to IV in the following diagram represents one set.			1	1									
149	Match each of the following sets with one of the above areas!				1									
150	In a group of children, there are 20 children who like milk			1										
151	15 children like tea													
152	12 children like both beverages													
153	and 7 children like neither milk nor tea													
154	Build a Venn diagram based on the above information!				1									
155	How many children are there in that group!			1										
		0	0	7	6	0	0	0	0	0	0	0	0	0

Appendix XIV: The Analysis of Circumstantial Elements of Mathematics Texts in Chapter 7 o*Bilingual Mathematical Textbook 7B of Junior High School* Published by Erlangga

No	Clause Expressions	Circumstantial Elements												
		Extent	Location		Manner			Cause			Accompaniment			
		Di	Ti	Pl	Mns	Qu	Co	Rsn	Pr	Bhf	Cmt	Add	Mtr	Rl
1	Do the following unit conversation!													
2	Express the results of the following additions in degrees!					1								
3	Find the results of the following additions and subtractions!													
4	Look at the following figure!													
5	Based on the figure, name the following angles using three letters!				2									
6	Using three letters, name all the angles which have the following lines as one of their rays!				1									1
7	Construct the following angles using a protractor!				1									
8	$\angle ABC = 40^\circ$													
9	$\angle GHK = 115^\circ$													
10	$\angle STU = 67^\circ$													
11	$\angle AOB = 164^\circ$													
12	Use your protractor to measure each of the following angles.													
13	Write your results as, for example$\angle XYZ = 70^\circ$													1
14	By using a compass and a ruler, duplicate each of the following angles!				1									
15	Duplicate and bisect each of the following angles using a compass and a ruler!				1									
16	In the above ΔABC, bisect $\angle A$, $\angle B$, and $\angle C$!			1										
17	Draw a sketch for each of the following angles!								1					
18	Take a look at a clock face.													
19	How many right angles does the second hand rotate through if it moves from 12 to 12?	1												
20	A wheel of a bicycle completes 4 full turns.													
		1	0	1	6	1	0	0	1	0	0	0	0	2

No	Clause Expressions	Circumstantial Elements												
		Extent	Location		Manner			Cause			Accompaniment			
		Di	Ti	Pl	Mns	Qu	Co	Rsn	Pr	Bhf	Cmt	Add	Mtr	Rl
21	Construct the following angles using a compass and a ruler!				1									
22	Construct $\angle RST = 22{,}5^\circ$ on the following line!			1										
23	Using a compass and a ruler, construct a 120̊ angle				1									
24	Using a compass and a ruler, divide the 120̊ angle into 4 equal angles!				1									
25	Label each of the following angles as an acute angle or an obtuse angle!													1
26	Label each of the following angles as an acute angle, a right angle, an obtuse angle, or a reflex angle!													1
27	Show acute angles as many as you can find in the above figure!			1								1		
28	Show obtuse angles as many as you can find in the above figure!			1								1		
29	If the measure of $\angle BOC = 80^\circ$, find the measure of $\angle AOC$!													
30	If $y = 130$, find x!													
31	If $x = 74$, find y!													
32	Find the supplements of 15̊													
33	Find the values of a and b!													
34	Find the measure of $\angle ABD$ and $\angle PQS$!													
35	The measure of an angle is 5 times the measure of its supplement.													
36	Find the measure of that angle!													
37	The ratio of the measure of an angle to the measure of its supplement is 2 : 3.													
38	If $x = 35$, then find the value of y!													
39	If $y = 62$, then find the value of x!													
40	If $x = 0$, then find the value of y!													
		0	0	3	3	0	0	0	0	0	0	2	0	2

No	Clause Expressions	Circumstantial Elements												
		Extent	Location		Manner			Cause			Accompaniment			
		Di	Ti	Pl	Mns	Qu	Co	Rsn	Pr	Bhf	Cmt	Add	Mtr	Rl
41	Find the measure of the complement of each of the following angles!													
42	If the measure of $\angle A$ is twice the measure of its complement, find the measure of $\angle A$!													
43	If the measure of the complement of $\angle B$ is 1½ times the measure of $\angle B$, find the measure of $\angle B$!													
44	Show two pairs of opposite angles!													
45	Show the pairs of opposite angles as many as you can find!											1		
46	Find the measure of $\angle BOC$													
47	In the figure below, find the values of a, b, and c!			1										
48	In the above figure, show the intersection point between each of the following pairs of lines!			1										
49	Look at the above picture of a cuboid.													
50	Show four edged which are vertical lines!													
51	Tell whether the following statements are *true* or *false*!													
52	It is impossible for two horizontal lines to be perpendicular to each other.								1					
53	If a vertical line and a horizontal line meet, then both lines will form four right angles.													
54	It is impossible for two vertical lines to be perpendicular to each other.								1					
55	If two lines are perpendicular to each other, then one of them must be a vertical line while the other must be a horizontal line.													
56	If there is a horizontal line, any line which is perpendicular to it must be a vertical line.													
57	Show all edges which are in a vertical direction!			1										
58	In the above figure, find two pairs of parallel lines!			1										
59	From the above figure, show the line which is parallel to each of the following lines!			1										
60	From the above cuboid $ABCD.EFGH$, find the edges which are parallel to each of the following edges!			1										
		0	0	6	0	0	0	0	2	0	0	1	0	0

No	Clause Expressions	Circumstantial Elements												
		Extent	Location		Manner			Cause			Accompaniment			
		Di	Ti	Pl	Mns	Qu	Co	Rsn	Pr	Bhf	Cmt	Add	Mtr	Rl
61	Line p // line q. If line r intersects line p, then line r also intersects line q.													
62	If line k intersects line l, then line k intersects line m.													
63	If line a and line b pass through point P and both lines are parallel to line q, then line a and line b are coincident.													
64	In the above figure, line p // line q are intersected by a line r.			1										
65	Tell the numbers which label the corresponding angles!													
66	In the above figure, find three pairs of corresponding angles!			1										
67	In the above figure, find four pairs of alternate interior angles!			1										
68	In the above figure, $\angle SPQ = 70^\circ$			1										
69	Find the measure of each of the following angles!													
70	The above figure shows a staircase with parallel posts.				1									
71	Find the values of p and q in the following figure!			1										
72	In the above figure, AC // FE, and $\angle DBC = 115^\circ$			1										
73	Find the measure of $\angle ABE$!													
		0	0	6	1	0	0	0	0	0	0	0	0	0

Appendix XV: The Analysis of Circumstantial Elements of Mathematics Texts in Chapter 8 o*Bilingual Mathematical Textbook 7B of Junior High School* Published by Erlangga

No	Clause Expressions	Circumstantial Elements												
		Extent	Location		Manner			Cause			Accompaniment			
		Di	Ti	Pl	Mns	Qu	Co	Rsn	Pr	Bhf	Cmt	Add	Mtr	Rl
1	Draw a rectangle $PQRS$ with its diagonals and then show the two pairs of parallel sides!				1									
2	In the above figure, $DEFG$ is a rectangle.			1										
3	Find the value of a!													
4	In a rectangle $KLMN$, the length of KL = 6 cm, MN = $3y$ cm, and the measure of $\angle LKN$ = $5n^\circ$.			1										
5	Find the value of y!													
6	Draw a rectangle $ABCD$ whose diagonals intersect at point O.													
7	If the length of AC = 10 cm, find the length of BD!													
8	The length of each diagonal in a rectangle is ($4x$ - 3) cm and ($2x$ + 7) cm			1										
9	Find the value of x!													
10	From the above square $PQRS$, show three lines which have the same length as PQ!			1										1
11	In a square $ABCD$, the length of the diagonal AC = 15 cm and the length of the diagonal BD = ($2x$ + 7) cm.			1										
12	Draw a square $DEFG$ whose diagonals intersect at a point H.													
13	If the length of DE = 12 cm, and the length of the diagonal DF = 17 cm, find the lengths of DG and GF!													
14	Nine squares whose sides have length 12 cm are arranged so as to form a bigger square.													1
15	Make a drawing of that square!													
16	What is the length of each side of the new bigger square!													
17	A rectangle is 8 cm long and 5 cm wide. Find its perimeter!													
18	The perimeter of a rectangle = 60 cm and its length = 20 cm. Find its width!													
19	Find the perimeter of a square whose sides have length 15 cm!													
20	The perimeter of a square = 80 cm.													
		0	0	5	1	0	0	0	0	0	0	0	0	2

No	Clause Expressions	Circumstantial Elements												
		Extent	Location		Manner			Cause			Accompaniment			
		Di	Ti	Pl	Mns	Qu	Co	Rsn	Pr	Bhf	Cmt	Add	Mtr	Rl
21	Find the length of each of its sides!													
22	The perimeter of a rectangle = 100 cm.													
23	The ratio of its length to its width is 3 : 2.													
24	Find its length and width!													
25	The perimeter of a square is equal to the perimeter of a rectangle.													
26	If the perimeter of the square = 40 cm and the width of the rectangle = 5 cm, then find the length of the rectangle!													
27	Find the perimeter of the shaded area in each of the following figures!			1										
28	Find the area of the rectangle whose length and width measure 6 cm and 4 cm!													
29	The area of a rectangle = 150 cm² and its width = 10 cm. Find its length!													
30	Find the area of the square whose sides have the following length!													
31	The perimeter of a square is 48 cm. Find its area!													
32	The area of a square is = 64 cm².													
33	Find the length of each of its sides!													
34	$KLMN$ is a parallelogram whose diagonals intersect at a point T.													
35	Name two pairs of parallel lines!													
36	Name four pairs of lines which are equal in length!					1								
37	Name two pairs of interior angles which are equal in measure!					1								
38	Duplicate the following parallelograms, and then find the length of each unknown side and the measure of each unknown angle!													
39	Find the values of x and y in each of the following parallelogram!			1										
40	PQ and RS are two straight lines which intersect at their midpoints O.													
		0	0	2	0	2	0	0	0	0	0	0	0	0

No	Clause Expressions	Circumstantial Elements												
		Extent	Location		Manner			Cause			Accompaniment			
		Di	Ti	Pl	Mns	Qu	Co	Rsn	Pr	Bhf	Cmt	Add	Mtr	Rl
41	Is $PQRS$ a parallelogram?													
42	The ratio of the measure of an angle to that of an adjacent angle in a parallelogram is 2 : 3.													
43	Find the measure of each of the interior angles in that parallelogram!			1										
44	Find the area of each of the following parallelogram!													
45	The length of the base of a parallelogram = $4y$ cm and its altitude = $3y$ cm.													
46	If the area of that parallelogram is 192 cm², find the lengths of its base and altitude!													
47	Write down two formulas for the area of the above parallelogram $ABCD$!								1					
48	Find the area of the parallelogram $ABCD$!													
49	Find the length of CE using an equation formed from those formulas!			1	1									
50	Draw a parallelogram $PQRS$ with the length of PQ = 6 cm and the magnitude of $\angle QPS = 60^\circ$				1									
51	Draw the altitude ST and then measure its length to the nearest mm!			1										
52	Find the area of that parallelogram!													
53	Duplicate the following rhombi and write the measure of each interior angle in each figure!			1										
54	In a rhombus $EFGH$, the length of side $EF = (5x - 3)$ cm and that of side $GH = (2x + 3)$ cm.			1										
55	Find the length of each side of that rhombus!													
56	Tell whether each of the following statements is true or false for every rhombus!								1					
57	All sides are equal in length.					1								
58	The two diagonals are equal in length.					1								
59	The two diagonals bisect each other.													
60	In the rhombus $ABCD$ above, find the value of x!			1										
		0	0	6	2	2	0	0	2	0	0	0	0	0

No	Clause Expressions	Circumstantial Elements												
		Extent	Location		Manner			Cause			Accompaniment			
		Di	Ti	Pl	Mns	Qu	Co	Rsn	Pr	Bhf	Cmt	Add	Mtr	Rl
61	In a rhombus $ABCD$, $AC : BD = 4 : 3$.			1										
62	If the rhombus area is 150 cm², find the length of the diagonals AC and BD!													
63	Find the area of the rhombus whose diagonals are 9 cm and 12 cm long!													
64	Draw a kite ABCD and its diagonals, and then mark the lines and angles which have the same measure!													
65	Duplicate the following kites and write the measure of each interior angle!													
66	Tell whether each of the following statements is true or false for every kite!								1					
67	The diagonals are equal in length.					1								
68	The diagonals intersect at a right angle.													
69	Every kite has two pairs of sides with the same length.				1									
70	The opposite interior angles are equal in measure.					1								
71	Find the area of each of the following kites!													
72	The area of kite is 60 cm²													
73	If the length of one of its diagonals is 8 cm, find the length of the other diagonal!													
74	Find the shaded figure in the above figure!			1										
75	Duplicate the following trapeziums and then write the measure of each interior angle!													
76	In an isosceles trapezium $ABCD$, the length of $AD = BC$, and the measure of $A = 60^\circ$			1										
77	Find the measure of each of $\angle B$!													
78	Find the area of each of the following trapeziums!													
79	The ratio of the lengths of parallel opposite sides of a trapezium is 4 : 3.													
80	If the altitude of the trapezium is 8 cm, and its area is 84 cm², then find the lengths of the parallel sides!													
		0	0	3	1	2	0	0	1	0	0	0	0	0

No	Clause Expressions	Circumstantial Elements												
		Extent	Location		Manner			Cause			Accompaniment			
		Di	Ti	Pl	Mns	Qu	Co	Rsn	Pr	Bhf	Cmt	Add	Mtr	Rl
81	A rectangular garden measures 9 m x 6 m.													
82	If lamp posts are to be installed at the perimeter of that garden with a distance of 3 m between every two posts, then how many lamp			1	1									
83	The following figure shows a square boxing ring with sides measuring 6 m each.				1									
84	Three strands of protecting rope are fastened around its perimeter.			1										
85	Find the perimeter of that boxing ring!													
86	How many meters of rope are required?													
87	The above figure shows a badminton field.													
88	That field is to be concreted at a cost of Rp60,000/m².													
89	What is the total cost for concreting the whole field?								1					
90	The above figure shows a roof of a house which consists of a pair of trapeziums and a pair of triangles.													
91	If every m² of the roof requires 20 roof-tiles, then how many roof-tiles are required to cover the whole roof?													
92	The above figure shows the interior of a room.													
93	The door measures 0.9 m x 2 m, and the window measures 1.5 m x 1.5 m.													
94	How many bricks are required to construct the room if every m² of the wall requires 70 bricks?													
		0	0	2	2	0	0	0	1	0	0	0	0	0

Appendix XVI: The Analysis of Circumstantial Elements of Mathematics Texts in Chapter 9 of *Bilingual Mathematical Textbook 7B of Junior High School* Published by Erlangga

No	Clause Expressions	Circumstantial Elements												
		Extent	Location		Manner			Cause			Accompaniment			
		Di	Ti	Pl	Mns	Qu	Co	Rsn	Pr	Bhf	Cmt	Add	Mtr	Rl
1	Among the following figures, which figure is an acute triangle?			1										
2	Look at the following figure!													
3	Name two isosceles triangles which have PO as one of their sides!													1
4	The above figure is an isosceles triangle ΔPQR.													
5	The lengths of PR = 15 cm and QS = 8 cm.													
6	Name two triangles which form ΔPQR!													
7	What are the lengths of PQ, SR, and QR?													
8	The following figures are isosceles triangles.													
9	Duplicate these figures and write down the unknown lengths of their sides and the unknown measures of their interior angles!													
10	Each of the following figures consist of two congruent isosceles triangles.													
11	In the above figure, ΔABC is an equilateral triangle in which the length of AB = 6 cm.			1										
12	Find the lengths of AC, BC, and BD!													
13	The above figure shows a tessellation with equilateral triangles in which the length of AB = 1 cm.				1									
14	How many equilateral triangles whose sides have lengths of 1 cm can you find?													
15	What is the total number of equilateral triangles?													
16	The above figure shows six congruent equilateral triangles which are laid side by side such that they form a regular hexagon.				1									
17	What is the measure of $\angle AOB$?													
18	Name 11 lines which have the same length as AB!													1
19	By using your compass and ruler, construct the perpendicular to the line XY through the point P!				2									
20	Construct an altitude through the vertex A in ΔABC if $\angle A$ is an acute angle!				1									
		0	0	2	5	0	0	0	0	0	0	0	0	2

No	Clause Expressions	Circumstantial Elements												
		Extent	Location		Manner			Cause			Accompaniment			
		Di	Ti	Pl	Mns	Qu	Co	Rsn	Pr	Bhf	Cmt	Add	Mtr	Rl
21	Construct the perpendicular to the line AB through the point Q!				1									
22	Construct a rhombus $ABCD$ in which the length of the diagonal AC = 5 cm and the diagonal BD = 8 cm!													
23	By using your protractor, measure each of the angles which you have constructed!				1									
24	Construct ΔABC in which $\angle A = 90^\circ$, AB = 5 cm, and AC = 3 cm!													
25	Find the measure of the third angle in a triangle if its two angles are given as follows!			1										1
26	The ratio of the measures of angles in a triangle is 2 : 3 : 4.			1										
27	Find the measure of each angle in that triangle!			1										
28	Find the values of m and n in the following figure!			1										
29	The measures of angles in a triangle are given by x°, $(40 + 3x)^\circ$, and $(30 + x)^\circ$.			1										
30	Find the value of x!													
31	Which of the following sets of three lines can be used to form a triangle?													
32	In the above figure, $\angle BAC = 60^\circ$ and $\angle CBD = 140^\circ$.			1										
33	Find the measure of $\angle ACB$!													
34	Find the perimeter of a triangle whose sides are 15 cm, 12 cm, and 18 cm!													
35	Find the perimeter of an equilateral triangle whose one of its sides is 16 cm long!													
36	In an isosceles triangle ABC, $AB = AC$, AB = 10 cm, and BC = 8 cm.			1										
37	Find the perimeter of the triangle!													
38	Find the areas of the triangles with the following measures!				1									
39	The area of a triangle is 120 cm² and its base is 30 cm.													
40	Find its altitude!													
41	Find the length of the base of a triangle whose area is 90 cm² and altitude is 18 cm!													
42	In the following ΔABC, the length of AB = 8 cm, AC = 6 cm, and BC = 10 cm.			1										
43	Find the area of ΔABC!													
		0	0	8	3	0	0	0	0	0	0	0	0	1

Appendix XVII: The Total Clauses of Mathematics Texts in *Bilingual Mathematical Textbook 7B of Junior High School* Published by Erlangga

Chapter	Exercise	The Total Clauses
6	1	6
	2	15
	3	12
	4	1
	5	1
	6	19
	7	6
	8	17
	9	8
	10	28
	11	24
	12	5
	13	7
	14	6
TOTAL	**14**	**155**

Chapter	Exercise	The Total Clauses
7	1	1
	2	2
	3	3
	4	7
	5	1
	6	2
	7	4
	8	4
	9	4
	10	9
	11	6
	12	4
	13	10
	14	6
	15	4
	16	4
	17	2
	18	0
TOTAL	**18**	**73**

Chapter	Exercise	The Total Clauses
8	1	9
	2	7
	3	11
	4	6
	5	10
	6	9
	7	11
	8	11
	9	6
	10	14
TOTAL	**10**	**94**

Chapter	Exercise	The Total Clauses
9	1	4
	2	6
	3	8
	4	4
	5	1
	6	0
	7	1
	8	6
	9	3
	10	4
	11	6
	12	0
TOTAL	**12**	**43**

The Total Clauses: 212 + 146 + 124 + 116 = 598
The Total Exercises: 14 + 18 + 10 + 12 = 54

The Total Clauses which are being analyzed: 155 + 73 + 94 + 43 = 365

Appendix XVIII: **The Total Process Types of Mathematics Texts in *Bilingual Mathematical Textbook 7B of Junior High School* Published by Erlangga**

No	Chapter	Process Types										
		Mat	**Men**	**RAI**	**RII**	**RAC**	**RIC**	**RAP**	**RIP**	**Ver**	**Bh**	**Ext**
1	6	59	8	24	77	0	0	0	0	2	0	0
2	7	55	3	10	22	0	0	0	0	2	0	1
3	8	71	0	13	45	0	0	1	1	2	0	0
4	9	29	1	5	18	0	0	1	1	0	0	0
TOTAL		**214**	**12**	**52**	**162**	**0**	**0**	**2**	**2**	**6**	**0**	**1**

The Total Process Types: 214 + 12 + 52 + 162 + 0 + 0 + 2 + 2 + 6 + 0 + 1 = **451**

The Percentages of Process Types

No	Process Types	Number	Percentages
1	Material	214	47.45%
2	Mental	12	2.66%
3	Relational	218	48.34%
4	Verbal	6	1.33%
5	Behavioural	0	0%
6	Existential	1	0.22%
TOTAL		**451**	**100%**

Appendix XIX: **The Total Participant Functions of Mathematics Texts in *Bilingual Mathematical Textbook 7B of Junior High School* Published by Erlangga**

No	Chapter	Participant Functions																	
		Act	**Gl**	**Rec**	**Cl**	**Rg**	**Agn**	**Sns**	**Phe**	**Car**	**Att**	**Id**	**Ir**	**Sy**	**Rcv**	**Vb**	**Tg**	**Bhv**	**Bho**	**Ex**
1	6	1	54	0	0	0	0	3	8	24	24	77	77	0	0	3	0	0	0	2
2	7	5	52	0	0	0	0	0	3	10	10	22	22	0	0	2	0	0	0	1
3	8	3	70	0	0	0	0	0	0	14	14	43	43	0	0	2	0	0	0	0
4	9	2	29	0	0	0	0	0	1	6	6	18	18	0	0	0	0	0	0	0
TOTAL		**11**	**205**	**0**	**0**	**0**	**0**	**3**	**12**	**54**	**54**	**160**	**160**	**0**	**0**	**7**	**0**	**0**	**0**	**3**

The Total Participants Functions: 11 + 205 + 0 + 0 + 0 + 0 + 3 + 12 + 54 + 54 + 160 + 160 + 0 + 0 + 7 + 0 + 0 + 0 + 3 = **669**

The Percentages of Participant Functions

No	Participant Function	Number	Percentages
1	of Material Process	216	32.29%
2	of Mental Process	15	2.24%
3	of Relational Process	428	63.98%
4	of Verbal Process	7	1.05%
5	of Behavioural Process	0	0%
6	of Existential Process	3	0.45%
TOTAL		**669**	**100%**

Appendix XX: **The Total Participant Types of Mathematics Texts in *Bilingual Mathematical Textbook 7B of Junior High School* Published by Erlangga**

No	Chapter	Participant Types	
		N	NH
1	6	20	255
2	7	0	127
3	8	0	187
4	9	1	79
TOTAL		**21**	**648**

The Total Participant Types: 21 + 648 = **669**

The Percentages of Participant Types

No	Participant Types	Percentages
1	Human	3.14%
2	Non Human	98.86%
TOTAL		**100%**

Appendix XXI: **The Total Circumstantial Elements of Mathematics Texts in *Bilingual Mathematical Textbook 7B of Junior High School* Published by Erlangga**

No	Chapter	Circumstantial Elements													
		Extent		Location		Manner			Cause			Accompaniment			
		Du	Di	Ti	Pl	Mns	Qu	Co	Rsn	Pr	Bhf	Cmt	Add	Mtr	Rl
1	6	0	0	0	16	28	0	0	0	6	0	0	0	0	2
2	7	0	1	0	16	10	1	0	0	3	0	0	3	0	4
3	8	0	0	0	18	6	6	0	0	4	0	0	0	0	2
4	9	0	0	0	10	8	0	0	0	0	0	0	0	0	3
TOTAL		**0**	**1**	**0**	**60**	**52**	**7**	**0**	**0**	**13**	**0**	**0**	**3**	**0**	**11**

The Total Circumstantial Elements: 1 + 1 + 0 + 70 + 52 + 7 + 0 + 0 + 13 + 0 + 0 + 3 + 0 + 11 =**147**

The Percentages of Circumstantial Elements

No	Circumstantial Elements	Number	Percentages
1	Extent		
	Duration	0	0%
	Distance	1	0.68%
2	Location		
	Time	0	0%
	Place	60	40.82%
3	Manner		
	Means	52	35.34%
	Quality	7	4.76%
	Comparison	0	0%
4	Cause		
	Reason	0	0%
	Purpose	13	8.84%
	Behalf	0	0%
5	Accompaniment		
	Comitation	0	0%
	Addition	3	2.04%
6	Matter	0	0%
7	Role	11	7.48%
TOTAL		**147**	**100%**

Appendix XXII: ***Surat Keterangan***

SURAT KETERANGAN

Yang bertanda tangan di bawah ini:

Nama Lengkap	: Arifina Santiatmaja Sulistyo
Tempat, Tanggal Lahir	: Sukoharjo, 13 September 1985
Jenis Kelamin	: Perempuan
Pendidikan Terakhir	: S1 Pendidikan Bahasa Inggris – Universitas Negeri Yogyakarta

telah benar-benar menjadi *inter rater* dalam analisis teks matematika yang terdapat di Buku Matematika Bilingual SMP kelas 7B diterbitkan oleh Erlangga.

Surat keterangan ini dipergunakan untuk keperluan:

melengkapi persyaratan *trustworthiness of the data analysis* dalam skripsi yang berjudul **Transitivity Representations of Mathematics Texts in *Bilingual Mathematical Textbook 7B of Junior High School* Published by Erlangga.**

Demikian surat keterangan ini dibuat dengan sebenarnya, untuk dapat dipergunakan sebagaimana mestinya.

Yogyakarta, 17 Mei 2011

Arifina Santiatmaja Sulistyo

SURAT KETERANGAN

Yang bertanda tangan di bawah ini:

Nama Lengkap	: Intan Wijaya Utami
Tempat, Tanggal Lahir	: Sleman, 6 Mei 1987
Jenis Kelamin	: Perempuan
Pendidikan Terakhir	: SMA Muhammadiyah 1, Yogyakarta

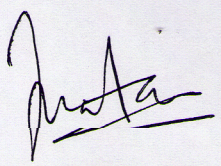
telah benar-benar menjadi *inter rater* dalam analisis teks matematika yang terdapat di Buku Matematika Bilingual SMP kelas 7B diterbitkan oleh Erlangga.

Surat keterangan ini dipergunakan untuk keperluan:

melengkapi persyaratan *trustworthiness of the data analysis* dalam skripsi yang berjudul **Transitivity Representations of Mathematics Texts in *Bilingual Mathematical Textbook 7B of Junior High School* Published by Erlangga**.

Demikian surat keterangan ini dibuat dengan sebenarnya, untuk dapat dipergunakan sebagaimana mestinya.

Yogyakarta, 17 Mei 2011



Intan Wijaya Utami